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Railway Age

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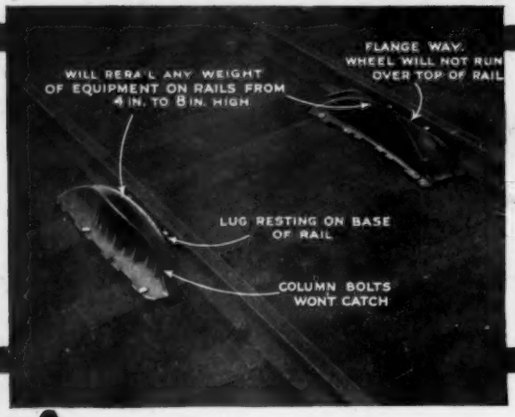
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EDITORIAL

Railway Age

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Improve Your Knowledge of Accounting

The recent appointment of a man whose training had been primarily in engineering as auditor of capital expenditures points definitely to the closer relation between engineering and accounting at the present time. This situation has been brought about by the greater attention which is being given to accounting on the railroads, and particularly by the employment of large forces of engineers on the federal valuation, but whether the work at hand concerns valuation or routine construction or maintenance, we find that the engineer must learn more about accounting, while the accountant has need of a better knowledge of engineering. The work of neither can be done without some knowledge of the other's problems. This fact was first driven home in connection with valuation and this led to the creation of such positions as engineer accountant. To advance an engineer to higher accounting positions is but another step. However, whether or not an engineer has any ambitions in the direction of the accounting department, he owes it to himself to extend his knowledge of accounting because of the intimate relation it has to the administration of the work under his direction, no matter what that may be.

I. C. C. Bureaus Stepping-Stones to Advancement

The new bureaus created by the Interstate Commerce Commission after the enlargement of its duties by the transportation act have proved stepping stones to higher positions lately for three former railroad officials who had left their roads to serve with the commission during the organization period of the commission's new activities. Col. F. G. Robbins, formerly general superintendent of the Erie, who was appointed director of the commission's new Bureau of Service in 1920, has recently resigned and been elected a vice-president of the Chicago & Erie at Chicago. Col. W. A. Colston, who was formerly general solicitor of the Louisville & Nashville, and was made director of the Bureau of Finance, organized by the commission in 1920, to handle matters pertaining to the commission's regulation of security issues, the six months' guaranty and similar matters, also resigned recently to become vice-president and general counsel of the Nickel Plate. Also, Guy J. Bunting, who left the Chicago, Milwaukee & St. Paul as assistant general auditor in 1920 to become assistant director of the Bureau of Finance, has now left the commission's service and has been appointed comptroller of the Illinois Central.

Meeting a Rerouting of Traffic

The drastic readjustments in service which the railways are frequently called upon to make with little or no warning are illustrated by the almost complete rerouting of coal traffic following the closing of the union mines on April 1, and the greatly increased activity of the non-union mines which have continued to operate principally in West Virginia and Kentucky. It has been the experience of practically all of the roads serving these areas that all records for the shipment of coal have been broken. As an instance the Louisville & Nashville, which serves the mines in eastern Kentucky, has been called upon to handle 50 per cent more coal than ever before. Similarly the Cincinnati-Toledo line of the Baltimore & Ohio, which carries much of this coal to Lake Erie ports, is now handling more traffic than during the period of the heaviest traffic of the war. Probably more interesting is the experience of the Illinois Central's Evansville, Ind., branch. This line normally operates a couple of freight trains in each direction daily; with the advent of the coal strike it was called upon suddenly to handle ten times that traffic. That no complaints are being heard regarding congestion and lack of service indicates that the railways are meeting this sudden dislocation and rearrangement of traffic satisfactorily. In fact, difficult as this situation has been, it is typical of the constant shifting in traffic which the roads face almost daily.

Large Increase in Freight Car Loading

The A.R.A. freight car loading report for the week ended on June 10 is again an interesting one, showing a total of 846,002 cars or only 33 less than were loaded in the last week before the coal strike, which showed the heaviest figures for any week this year. In spite of the decrease in coal loading the report shows an increase of 58,719 cars as compared with the corresponding week a year ago, although a reduction of 84,974 as compared with 1920, but a normal amount of coal traffic would have brought the total loading above that reported for the corresponding week of the record year 1920, which was 930,000. This figure was not attained in any week of 1921 until the middle of October. In spite of the coal strike the curve showing the loading this year is running about halfway between those for 1920 and 1921. There seems to have been little of the expected scramble for coal during the period of the strike thus far but it is certain that there will be a heavy demand for it before long and a settlement of the strike would soon create a need for the cars which are now included in the surplus reports as well as for many of those in the bad order list, which numbered 340,000 on June 1, or 15 per cent, as compared with 14.7 per cent only 15 days before.

Development by Co-operation

The entrance of the Pennsylvania into Detroit, described elsewhere in this issue, has been accomplished by methods that bear little similarity to those which prevailed in the old days of cut-throat competition. There is little resemblance to such projects as the Pennsylvania's entrance into New York, the Canadian Northern tunnel under Mt. Royal at Montreal or the ill-fated Pittsburgh project of the Wabash. In each of these cases the plan was projected independent of any other carrier. At New York, it is true, that the obstacles were primarily physical, but at Pittsburgh and at Montreal inability to secure running rights over one of the natural routes already occupied by other railroads led to the

development of less favorable locations at enormous expenditures. At Detroit the Pennsylvania has avoided the enormous outlay for an independent route by securing trackage rights from other roads and thereby restricting its capital expenditures to the development of independent terminal facilities and a 20-mile cutoff in open country. This manner of approaching the terminal problem is in keeping with the tendencies of the times—the joint operation of terminal routings to the end of a more effective utilization of the available facilities. It is true that in the case in point the roads involved are essentially non-competing so that the negotiations were greatly simplified. Nevertheless, the public is demanding that the development of railway properties in large cities shall gradually tend toward a more co-operative utilization as a means of reducing the capital charge against every ton of freight and every passenger carried.

Different Kinds of Block Systems

A complete block system is one in which there are automatic signals for all main line movements, with every switch operated from a tower. (Manual Signals are, theoretically, as safe as automatic, but extended comparisons have shown fewer false clear indications under the automatic system.) "Nearly complete" would be a fair description of an automatic system with all hand-thrown switches properly equipped with indicators. A system without indicators at switches would constitute another class. The manual system with the hand-thrown switches protected by distant signals constitutes still another. The reports on the recent collisions at Camps, Tex.; Woodmont, Pa.; Warner, Tex., and Welch, Mont., suggest other classifications, with varying degrees of part-way protection, down to no space interval at all, as at Plains, Kansas, (*Railway Age,* June 10, page 1332). The term "complete block system" is a misnomer to the extent that permissive signaling is allowed, except in clear weather, on short sections, where there are few curves in the line. Of the 63,000 miles of road reported to the Interstate Commerce Commission as operated by the manual block system (with presumably a small proportion of sections less than three miles long) a total length of only 5,121 miles appears in the column "permissive signaling for bidden"; and on a length of 46,326 miles the rule to stop absolutely at a stop signal is relaxed at passenger stations. On 16,909 miles (single track) the block signal rules are depended on for rear-end protection only. These facts concerning our country-wide practice should tend to make everybody cautious in boasting about mileage figures. Every enterprising operating officer aims, of course, to have a complete block system as soon as he can find the necessary money; but pending that millennial accomplishment the lessons of the last seven collisions reported by Mr. Borland call for strenuous efforts, in innumerable directions, looking to the cure of the weaknesses which the lessons expose.

Neatness in Handling Oil

The railroad news-gatherer or editor has to be on his guard against involuntary self-deception. Things new and good in the railroad field are brought to his attention, without effort on his part; but to see the old and bad he must go out and survey the field; and he must not present a distorted picture, showing the general situation better than it actually is. A new locomotive or signal tower is the subject of a special invitation to inspect; but if there is a slovenly back-shop or a disgraceful freight house that would afford him the topic for a useful lecture, which would be good for his readers, he must go and hunt it up. This thought has been suggested by reading the rules for the care of oil lamps which are printed in this issue, in the report of the annual meeting of the signal engineers. A second thought is that careful attention to these rules is needed in other places than signal cabins—and that is the reason that they are published here. A dirty oil room is a far too familiar sight at passenger and freight stations, yard offices, crossing shanties, section houses, and other places. Where such conditions are very bad the fire insurance inspectors can be depended on to call attention to them; and if the inspectors do their full duty they will see to necessary corrections; but the point is mentioned here as a plea for the enforcement of neatness at such places regardless of the insurance inspector. Do not wait for him; nor for the safety-first committee to make a "suggestion." Ask the general passenger agent to "suggest" how many times he has had to apologize to passengers for the existence of offensive sights, greeting their eyes at many places, which are due to shiftlessness and laziness in handling oil. When it comes to details, these lamp rules may be open to criticism here and there. The first rule, No. 1601, is printed on page 44; is repeated on page 46 as a question in an examination paper and again, on page 47 as an answer to the question. That amount of paper and ink might well have been spent on something to give a little "punch" to so important a rule.

The Railways Should Be Represented

Because of the numerous differences of opinion which prevail between the producers and the consumers of lumber products, a conference of representatives of both parties was called by Herbert Hoover, secretary of the Department of Commerce, at Washington during the week of May 22. At this conference plans were formulated for the more general standardization of grades and dimensions to promote economy of manufacture and particularly to insure to the consumer that he secures the material which he desires. The railways have not escaped participation in the controversies which have led up to this conference, for they are among the largest consumers of timber products and they have long been criticized by the lumber producers for their manner of purchasing this material. The roads were therefore invited to participate in this conference and to present their position in this special controversy as well as in those common to the lumber industry. Railway uses for timber fall into three general classes: construction timbers, tie and switch timbers and car materials. It is to be regretted that the railways did not arrange for adequate representation at this conference by a sufficient number of men to insure familiarity with all of these uses. The result is that the needs of the railways were not presented in the thorough manner in which they should have been. Since it is the expressed intention of Secretary Hoover that this work shall proceed to a conclusion, it is to be hoped that the railways will realize the importance of the subject sufficiently to study their lumber requirements in sufficient detail so that they can defend their standards or revise them to agree with American manufacturing conditions as their investigation warrants. Timber purchases constitute so large a drain upon railway revenues and the roads have been subjected to criticism regarding their purchasing methods for so long that they owe it to themselves to investigate the subject in detail in order to satisfy themselves that they are buying the materials most suited to their needs; that they are buying these materials in the sizes which are most economical in the light of their requirements and present manufacturing conditions and that they are getting the materials of the grades and sizes that they specify. As a large consumer of lumber the railways have much to gain from taking part in these conferences,

and it is to be hoped that they will organize promptly to participate with lumber producers and others in the investigations which are now being inaugurated.

An Incentive May Help

It is related in an old fable that an ingenious driver hastened the motion of his not overly ambitious steed by dangling a wisp of hay ahead of the animal. By this simple expedient he was able to accomplish what he could not attain by club or whip. Some operating officers are now applying the moral of this story to the employees under their direction with equally satisfactory results. The tendency of the labor organizations in negotiating agreements with the roads in recent years has been to extend the work by introducing complications which in effect add to the number of men employed. As an illustration, the present agreement with the men in train service provides an incentive for the crews to loiter on the road to the point where overtime is earned, thereby increasing their income. Such a condition cannot be expected to do other than to slow down the movement of traffic, the result of which is reflected not only in the added wage cost but to an even greater extent in the decreased capacity of the line and the reduced use of equipment and other facilities. To overcome this by discipline and supervision is difficult and to a large extent impossible, for much of the responsibility for the movement of trains must be left to the crews in charge. However, a way out of the dilemma is to offer a counter incentive which is stronger than the first one. Such an expedient was referred to editorially in these columns a few weeks ago where reference was made to an arrangement which has been perfected on several divisions of one road for return trains to be made ready for crews who have made runs to the away-from-home terminal in less than eight hours so that they can avoid being tied up at this terminal and have double the normal layover at home. This simple expedient reduced the average time of trains over one division from 11 hours to approximately 7 hours. This same result was accomplished in a large classification yard by offering to allow the switching crews to go home after they had completed work which formerly required 10 or 11 hours, the men speeding up their work to the point where the trains were made up and started on their way three hours earlier than formerly. The application of measures such as these will enlist the co-operation of the men in many instances and secure results which are mutually beneficial without additional expense.

Will They Strike for an "Economic Impossibility?"

THE STATEMENTS which are being issued by labor leaders regarding the wage reductions recently authorized by the Railroad Labor Board are extraordinary examples of brazen impudence. We refer to the dissenting opinions signed by Messrs. Wharton and Phillips, labor members of the board, as well as to the utterances of B. M. Jewell and other heads of the labor organizations. They are attempting to mislead the public and incite their followers to strike by as bold misrepresentations as ever were put in circulation.

For the employees whose wages are to be reduced to strike would not be a technical violation of the Transportation Act, but it would constitute a complete disregard of the Labor Board's findings of fact and principle and an open defiance of it. To shift from themselves the odium that they would incur by bringing on a strike, if the public understood the facts, the labor leaders, including the two labor members of the board mentioned, are brazenly attempting to make the public and employees believe the majority of the board themselves have violated the provisions of the Transportation Act.

The law requires the board, in fixing wages, to consider, among other things, the cost of living. The labor leaders, in the hearings before the board, contended that the board should establish an average wage on which an "average family of five" could live in comfort and decency. They contended that this average wage is $2,637. Because the board did not give this average wage they now denounce it as having violated the law by disregarding the provision regarding the cost of living and as having ignored the "claims of humanity."

This reasoning could be properly branded as approaching the idiotic if it did not constitute propaganda dangerous to the peace of the country. What are the facts? The law provides that the board, in fixing railway wages, shall consider *the wages paid in other industries for similar work* as well as the cost of living and other relevant considerations.

For the board to fix in the railroad industry such wages as the labor leaders demand would be to fix wages averaging probably three times as much as those being paid for similar work in other industries. The labor leaders answer that as high wages ought to be paid in other industries as they demand for railway employees. *But they are not;* and it is as plain as a pikestaff that for the Labor Board in fixing railway wages to disregard the fact that they are not would be for it really to violate the provisions of the law. Furthermore, the labor leaders, in demanding the payment of an average wage of $2,637 in all industries are, as the majority of the board well said, "propounding an economic impossibility." The payment of such an average wage in all the industries of the United States would cost at least one-half more than the largest total amount that all the industries of the United States ever produced in any year. It is very unfortunate that industry never has been able, and never will be able without a great increase in the efficiency of management and of employees, to produce enough to pay the labor leaders' "minimum average comfort and decency wage," but it is a fact which never has been disputed and which is indisputable that industry never has been able to; and therefore it is just as sane for the labor leaders now to cry aloud for such a wage as for a child to cry for the moon.

The cold fact is that, under the plain provisions of the Transportation Act, interpreted in accordance with its obvious intent, the labor leaders knew that they could not make a case against the reduction of railway wages. They knew they could not show that, measured by the wages paid in other industries, the "cost of living," as that standard always has been understood and applied, and the other standards set up by the Transportation Act, the existing wages of railway employees should be maintained. Therefore, for purposes of propaganda, and probably with no expectation of gaining anything for their followers by doing so, they set up as the standard of reasonableness of wages, a purely fictitious and economically impossible standard of their own; and now they are trying to provoke a strike by appealing from the standard established by the law to the standard invented by themselves and which, by childishly sophistical reasoning they are trying to read into the law. They are threatening the people of the United States with, and are trying to lead their followers into, a great strike that would be equally disastrous to employees and public, to vindicate a theory of wages which they themselves know as well as anybody, is, under present conditions, merely the baseless fabric of a vision.

The situation strikingly illustrates the fact that the main trouble with many railway labor unions, as well as many other labor unions, is their reckless, irresponsible and incompetent leadership. Their leaders did not in the recent wage case present their case to the Labor Board on its merits

properly supported by evidence which was relevant and material under the actual provisions of the Transportation Act, and now they are trying to discredit the Labor Board and bring about a strike because they lost a case which they never reasonably and adequately presented. Such labor leadership is a menace to the peace and welfare of the country, but it is a still worse menace to the welfare of the members of the labor unions.

Is a "Car Shortage" Coming?

IT IS TIME to raise very seriously the question whether the railways are not approaching another period of congestion of traffic and "shortage of cars."

On May 31 the number of idle freight cars was 504,702. Of these 305,198 were cars in serviceable condition. These statistics do not indicate any danger of a shortage of equipment. But let us consider some other facts. The number of cars loaded with freight in the week ended May 28 was 821,121. The number of cars loaded with coal was 74,241 less than in the same week of 1921 and 83,242 less than in the same week of 1920. If coal loadings had been normal the total number of cars loaded would have been approximately 900,000.

With the small number of cars of coal moved, the railways handled their freight business in the week mentioned without any difficulty. If, however, the roads had had to handle, say, 100,000 car loads more, the conditions would have been quite different. The movement of these additional cars would have greatly increased the demands upon their locomotive power and their terminals, and would have tended to slow down the movement of all cars handled under load. Whatever slows down the average movement of cars actually in service reduces the supply of cars in proportion to the demand. It is much easier to handle 800,000 loads a week without delays and congestions than to handle 900,000 without delays and congestions.

It is but a matter of time until the coal strike will be settled, after which, owing to the depletion of coal stocks, the railways undoubtedly will be called on to move at least 100,000 loads of coal weekly more than they are moving. Experience in the fall of 1919 and again in 1920 showed that with the facilities then available it was extremely difficult for them to handle more than 1,000,000 carloads of all freight weekly. Doubtless they can handle a larger amount of freight now than they could then; but the increase in their capacity has been relatively small.

It is evident, therefore, that a large increase of coal shipments and a continuance of the increase of other traffic would soon tax them to their capacity. But will other traffic continue to increase?

There are strong reasons for believing it will. First, crop prospects, especially in the west, are unusually good. Second, building operations are growing throughout the country. Third, there are many signs that the stocks that most manufacturers and merchants have on hand are low, and that as the signs of returning prosperity become more numerous and convincing the demand for the raw materials of manufacture, as well as for finished products, will grow rapidly.

All these conditions indicate that traffic other than coal will continue to increase. In other words, it would appear that the only thing needed to give the railways a business that will break all records is a settlement of the coal strike.

If this is the case, the only possible way to avoid car shortages and congestions within a few months are, first, to speed up the repairs of all equipment that is not in serviceable condition; secondly, to speed up the construction of new equipment and railway improvement work already ordered; and, third, to begin an effective campaign to secure the most efficient utilization possible of all available railway facilities.

During the period of business depression shippers have been allowed to reduce the tonnage loaded per car. Efforts should be begun at once to secure heavier loading of cars and to reduce the time used in loading and unloading. The railway managements should prepare to intensify supervision of the movement of cars to prevent all unnecessary delays at stations or in yards. Every feasible plan for increasing the average mileage traveled daily by locombtives should be put into effect.

In 1920 the greatest transportation difficulties in history were met and overcome by the co-operation of the railways through the American Railway Association and by the efforts of the individual managements. The lessons learned then should be remembered and the methods used then should be revived. It may be the heavy business that now seems probable will not develop. It would be far better to make preparations for it and not have it come than to have it come and catch the railways unprepared.

The Automatic Train Control Order

THE INTERSTATE Commerce Commission has confirmed its train control order substantially as it was first published, last January. The date is made six months later, but otherwise it is left in about the original terms; the desired clause permitting enginemen to prevent the operation of an automatic stop while the train is in motion is not included.

The order is dated June 13; order No. 13,413. It requires 49 railroads to make installations of automatic train control "on at least one full passenger-locomotive division," between the cities named in the order, the work to be completed by January 1, 1925.

Some of the outstanding features of the order are (1) its extensive and drastic application; (2) the short extension of time allowed for testing devices not yet developed; (3) the elimination of the permissive release feature of the automatic stop; (4) the provision whereby roads so desiring may make installations of train control without the use of visual roadside signals; and (5) the lack of consideration for roads which are planning to install visual signals extensively. This last comment might be broadened to include costly improvements of all kinds, for a main issue with the railroad manager is the distribution, over a practicable period of time, of his heavy expenditures, of which signaling constitutes only one feature. To put in a single class the road which is now spending a million dollars for signals and those roads which have no large work of that kind in hand seems a very crude arrangement, to say the least.

The specifications are identical with those of the tentative order, as are the carriers listed, except that for the St. Louis-San Francisco the tentative order specified the line from St. Louis, Mo., to Springfield, while the final order says between Springfield, Mo., and Tulsa, Okla.

The Commission says that the Transportation Act, 1920, places upon it "the duty, after investigation, of ordering the roads, or any of them, to install automatic train stops or train control devices or other safety devices." The law does not use the word "duty;" it is permissive; but the commissioners evidently predicate their interpretation (that a duty is imposed) on their statement that the result of investigations *and the recognized need* constituted the reason why Congress inserted section 26 in the Transportation Act. In other words, Congress says that they *may* order automatic stops; and they change this to *will order* automatic stops on the strength of their finding that there is a need. There would be far greater satisfaction with the present situation if this finding—involving expenditures of many millions—had been based on a well-reasoned and scientific report, prepared by eminent engineers, instead of on a series of compromises and half-truths backed by no names except those

of eleven commissioners, no one of whom is an engineer.

The principle of automatic train control—at least on lines of heavy traffic— should be valuable, properly used; for the subway lines have proved it; and as passenger lines become more congested it is an element in increasing capacity, if complete safety is to be attained. But train control, like any other development, should grow gradually, and an order as drastic as this one is not reasonably calculated to serve the purpose intended which, as we view it, is the putting an end to the period of discussion. It is questionable whether this order will serve the purpose aimed at by the Commission. Apparently some roads will actually defer intended installations of automatic signals because of the probable cost of complying with the present order. The extension of time allowed to test out new devices is entirely inadequate, as may be seen by the time which has been taken by prominent experimenters. A road which, for example, desires to await the final reports of the experiments now being made on the New York Central, the Delaware, Lackawanna & Western, the Pere Marquette, the Rock Island and the Pennsylvania, and which wishes to decide its course before next January, is in a perplexing quandary.

Forty-nine—or even 29—costly experiments to test less than a dozen systems cannot be called other than reckless extravagance. It has to be admitted, however, that unless the government were to build or buy several hundred miles of railroad on which to make experiments, the establishment and execution of a workable plan, in place of the 49-fold scheme, would call for constructive engineering and constructive statesmanship of a high order. But these are two qualities which the commissioners seem not to appreciate in this connection.

The Valuation Amendment

COMPARATIVELY LITTLE attention has been devoted in the press to the fact that Congress has just passed and the President now has before him for signature bill, S. 539, amending the railroad valuation act of 1913 so that the Interstate Commerce Commission will not be required to include in its valuation reports a figure representing what it would cost a railroad to reacquire its right of way and other lands if the railroad were to be reproduced under present conditions. What has been published has generally been of the erroneous character displayed in campaign statements of Congressmen seeking re-election that the bill will reduce the valuation of the roads on which freight rates are to be based by amounts ranging from three to six billions. Many of the Congressmen who voted for the bill were doubtless as ignorant of its purpose as was Representative Campbell, chairman of the rules committee of the House, who in introducing a rule for the debate on the bill said that it "provides in substance that in the revaluation of the railways the value of the real estate used by the roads for depot and other purposes may not be taken into consideration."

Many of them would have been willing to vote even for that kind of bill and we hope their constituents may in some way be able to call them to account when they learn that the billions to be saved had long ago been left in the discard by the commission.

As a matter of fact, all that has happened is that Congress has directed the commission that it need not even go to the trouble of finding one of the evidentiary facts which represents part of the cost of building a railroad and that having reported that fact in the case of over 200 roads and collected most of the data referring to it for the other roads during the past year and a half, it may throw it away or file it away against the time when some court may order it used again.

The bill amends the valuation law by inserting, in the paragraph directing the commission to report as to each piece of property the original cost, the cost of reproduction new and the cost of reproduction less depreciation, the words "other than land," so that it need not report the cost of reproduction of land. Then it strikes out of the paragraph directing a report on the original cost and present value of land the words "and separately the original and present cost of condemnation and damages or of purchase in excess of such original cost or present value."

Until directed to do so by the Supreme Court in its decision in the mandamus proceeding brought by the Kansas City Southern in May, 1920, the commission had declined to comply with this direction of the law on the ground that it involved a consideration by it of matters beyond the possibility of "rational determination," calling for "inadmissible assumptions" and "impossible hypotheses," and that under the Supreme Court's decision in the Minnesota rate case the information was of no value if collected. The assumption and hypothesis which the commission was so reluctant to accept was that if the railroads were to be reproduced today, or even if a new railroad were to be built under present conditions, it would in most cases cost to acquire the necessary land a sum so enormous as to be difficult of conservative estimate. The court held, however, that the conclusion of the commission was erroneous and directed it to comply with the statute as written. The commission then asked Congress to change the law but during the delay in getting action on the bill it has gone ahead and done what it had previously declared impossible. The late director of the valuation bureau, C. A. Prouty, said on February 7, 1921, that "the result in the very nature of things is an average estimate, but within the limitations fixed by those terms it will be accurate;" and that the work was then about one-half done and should be completed in from a year to a year and one-half.

The commission issued supplemental reports as to the roads on which tentative valuations had already been served and in the reports since issued it has inserted an item for what it calls the "excess cost" of land, arrived at by applying to the value of adjacent land, according to a zone system, a multiple ranging from 55 per cent for highly developed residential property to 200 per cent for low grade land. In 198 tentative valuations the total present value of lands amounted to $156,345,283 and the total excess cost of acquisition to $121,167,073, or 77½ per cent of the present value; but analysis indicates that in taking into consideration the various factors from which it evolves a so-called "final value" little or no weight has been attributed to the cost of acquisition.

One of the principal grounds on which the commission urged that this requirement be omitted from the act was that it would save the expense, estimated by Judge Prouty at approximately $300,000 a year, of doing a "vain thing," but a large part of the work has now been done and apparently the commission has made no practical use of it.

The railroads, in opposing the bill, urged that even though the commission disregarded this item of evidence the amendment was an attempt to settle a judicial question by legislation because it would strike out an element of value in the property of common carriers which always has been recognized in the common law; and that if the commission makes a valuation without considering that element much delay might be caused by a court order requiring that it be taken into account.

The chief appeal to members of Congress in the proposed legislation doubtless lay in the argument advanced on behalf of the state railroad commissioners that approximately 12½ per cent, or $2,000,000,000, of the $18,900,000,000 adopted as a tentative valuation by the commission in 1920, represents land and that the railroads might succeed in getting a

multiple of 2 or 3 applied to this and thereby add $4,000,000,000 to $6,000,000,000 to the value used as a basis for the rate of return.

Of course, if the courts decide that something should be included in the value to represent what it would cost to acquire land it will eventually be included whether or not Congress or the commission thinks it should be; but as long as the commission and Congress may fix the rate of return (above the limit of confiscation) and as long as the commission may estimate the rates, traffic and expenses that will produce a given return for the future, it would seem that the only practical benefit of the bill just passed will be that derived from its possibilities as a source of campaign literature.

New Books

Railway Accounting Procedure, 1922 Edition. Edited by E. R. Woodson, Published by the Railway Accounting Officers' Association, 1116 Woodward Building, Washington, D. C. 6 by 9 in.; 468 pages. Bound in cloth. Price $1.00.

This is the 1922 edition of the book published formerly under the name of the R. A. O. A. Synopsis. It does not differ materially from the editions of other years with the exception that it is larger and covers a considerably increased number of subjects. The editing has been changed also to some extent so that the publication has somewhat more the character of a book on the subject with which it deals rather than that of a synopsis only. The present book contains 468 pages; the 1921 R. A. O. A. Synopsis contained 400; that of 1920 but 228. In these years there has been no change in the plan; the increase in size results from the amount of work which this busy association has succeeded in accomplishing. Under these conditions and considering in general that the association has discussed so many subjects and its activities have been so extensive, the word "Synopsis" is no longer sufficiently broad or inclusive to cover the amount of material presented. The new name, "Railway Accounting Procedure," is more appropriate.

The Railway Accounting Officers' Association does its work largely through committees. A subject, when it is presented on the floor of the annual meeting, has therefore received a large amount of discussion in the committee and whatever action the association may take, is taken with that in mind. The book, under whatever name it may be known, "Railway Accounting Procedure," or "R. A. O. A. Synopsis," is a compendium of the findings of these committees as they have been discussed and accepted by the association for a period of years. Every subject in the book, therefore, is authoritative and represents the best thought of the association as to what should be considered standard practice in railway accounting. The book makes no presumption to be a treatise on the theory of railway accounting but deals only, as the name indicates, with matters of procedure. The value of a book of this kind hardly needs comment, particularly in view of the great amount of detail which is embodied in the work of compiling the accounts of a railway system. The best comment that can be made is that the book is indispensable.

The book is well arranged. It is divided into sections, these being headed as follows: freight, overcharge claim rules, passenger and disbursement. In the freight, passenger and disbursement sections there are presented first the mandatory rules, the rules that are recommendatory only, and finally, the standard forms, to which the R. A. O. A. has given a great amount of attention. The overcharge and agency relief claim rules are mandatory. There is also a section devoted to terminal accounting. Each section is carefully indexed.

Letters to the Editor

Outside Locomotive Repairs

LONDON, Eng.

TO THE EDITOR:

I submit that no one should be surprised that a majority of the Interstate Commerce Commission has censured the Pennsylvania and the New York Central for their failure to forecast the future when they employed outside agencies to repair their locomotive equipment.

It is true, though the commission does not in the report that I have seen notice the fact, that the railways erred in company with most of the great business firms, not only in America but in England, who laid in large stocks and increased their output capacity at top prices under the impression that the boom would last longer than in fact it did. It is true, too, that in coming to their decision the companies postponed the interest of their shareholders in economy to the interest of the public in efficient transport, and that if they had taken the cautious line and events had turned out differently, the Interstate Commerce Commission would have been prompt to rebuke them for failing to live up to their responsibility as a public utility undertaking. But the fact remains that the railway men did guess wrong.

Heretofore the railroads have guessed right, and the Interstate Commerce Commission wrong. I well remember, for I was in Washington at the time, the rates advance cases in 1911. It was then up to the commission to do the guessing. It prophesied that the cost of supplies would not much advance, and that wages would not much increase. Three years later it admitted in effect that they had been wrong in 1911. It said that the price of coal had increased 7.7 per cent and transportation wages 9.02 per cent. But again it refused to permit any substantial increase in rates. It thought the country was recovering from another period of depression. It said, in answer to the claim of the railroad officers who had testified, that they "would encounter great difficulty in renewing their maturing short term notes and other obligations"; that "subsequent developments have shown that there was little evidence for any such view . . . . With the growing ease in the money markets this difficulty has largely disappeared." This decision was given on July 29, 1914. Three days afterwards the Great War began.

As the result of these two erroneous forecasts of the Interstate Commerce Commission the railroads had to face the tremendous strain of the war period with plant and equipment barely adequate for normal needs. According to the commission report, the Pennsylvania and the New York Central spent unnecessarily, owing to this erroneous forecast, some $6,000,000 of their shareholders' money. It would be interesting if someone would estimate what the erroneous forecasts of the commission in 1911 and 1914 cost the American shipper in the years from 1915 to 1920.

Again, a year ago, the commission was required by Congress to make a forecast. It was instructed to fix such rates as would produce for the railroads a net return of not less than 5½ per cent. The rates it actually fixed produced about three per cent. Not a very accurate forecast! But for this, of course, no fair-minded man will blame the commission. The sudden and unexpected slump upset its calculations, just as it has upset those of the executives of the Pennsylvania and the New York Central. But I think it was only human nature that a majority of the commissioners should have felt that the commission's record as a prophet being what it was, it could not afford to neglect an opportunity of pointing out that even the railroads do not always guess right.

W. M. ACWORTH.

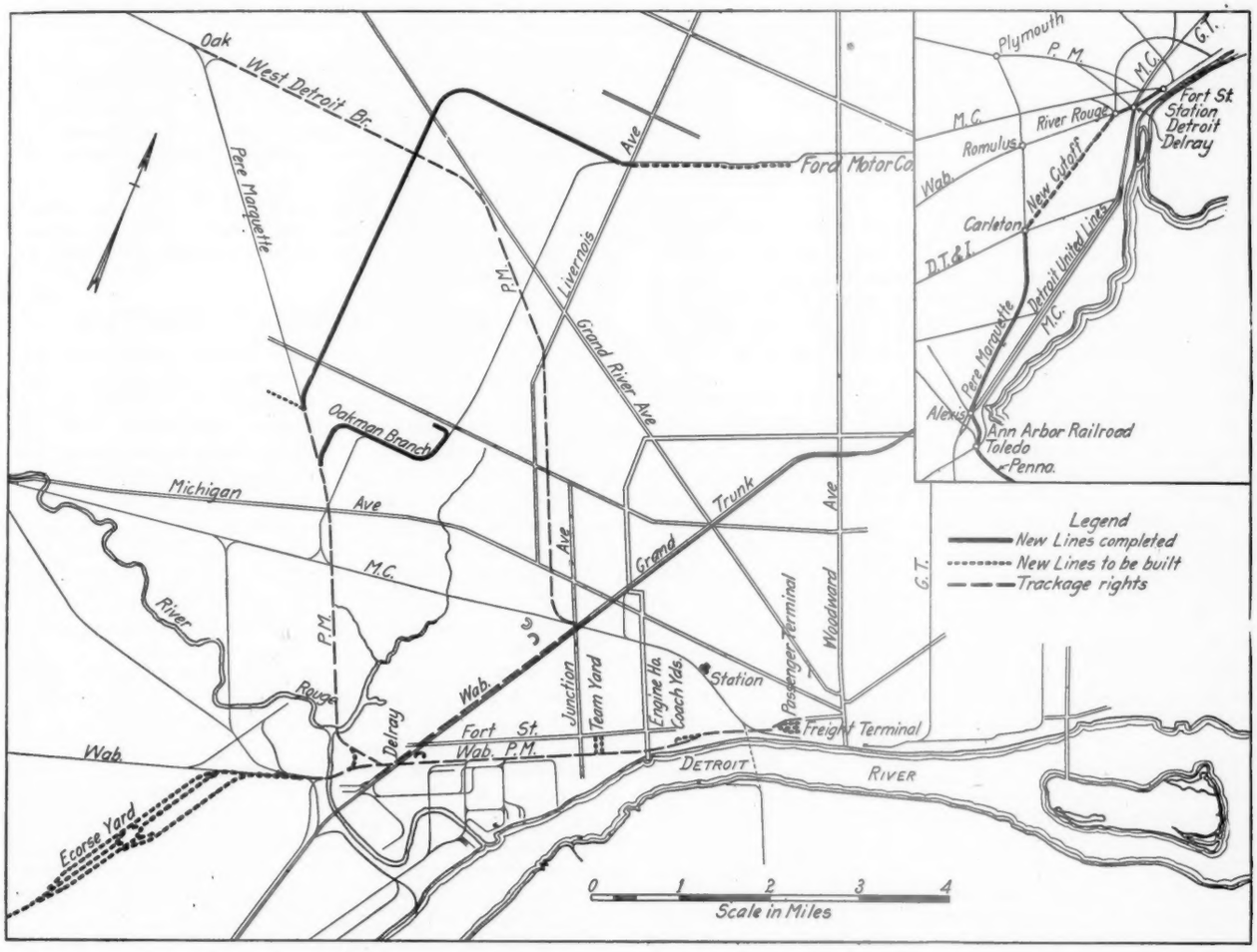
Pennsylvania to Complete Entrance Into Detroit

Project Includes a Local Freight Terminal, Classification Yard and 25 Miles of New Line

IT IS NOT OFTEN in these days that a railroad secures entrance into a great city where it has had no previous connections, yet a project of this kind is now being carried out by the Pennsylvania System with respect to the city of Detroit. Construction work completed or authorized, together with arrangements for using the facilities of other roads will afford the Pennsylvania convenient access to passenger and freight terminals in the heart of that city with switching connections to a large portion of the principal industries. The plans for the Pennsylvania's entrance to Detroit and preliminary negotiations were undertaken several years ago, but the project remained dormant during the period of government control and the depression which followed its close. Work has been resumed within the last few weeks following an announcement made recently by President Samuel Rea before the Detroit Board of Commerce in which he outlined the present status of the project and the plans for the immediate future.

Physically, the Detroit entrance comprises an extension of the Toledo division of the Northwestern region of the Pennsylvania from Toledo to Detroit, but the project is being conducted by a separate corporation, the Pennsylvania-Detroit Railroad. Of the total distance of 54 miles from the end of the Pennsylvania tracks in Toledo to the Fort Street station at Detroit, 20 miles will be new line, the rest of the distance will be covered on tracks of other roads.

The route of the Pennsylvania-Detroit Railroad begins at Toledo with the use of the Ann Arbor tracks from a junction with the Pennsylvania to a connection with the Pere Marquette at Alexis, a distance of 4.37 miles. The Ann Arbor will build a second track for this distance and reduce the grades to a maximum of 0.3 per cent. From Alexis, the Pennsylvania has acquired trackage rights over the Pere Marquette's double-track line for a distance of 25.33 miles to Carleton. From this point to a junction with the Wabash at River Rouge, the Pennsylvania has purchased right of way and is now constructing a new single-track line, 20 miles long on which it will provide a second track as soon as the traffic requires. The contract with the Pere Marquette provides that the latter road will have the privilege of using this new line under the same terms as the Pennsylvania will use the Pere Marquette facilities between Alexis and Carleton. From River Rouge, the Pennsylvania has running rights over the double-track line of the Wabash for a mile to Delray,



Map of the Detroit Terminals with Small Insert of the Toledo-Detroit Routing

the junction with the tracks of the Detroit Union Railroad Depot & Station Company, leased jointly by the Pere Marquette and the Wabash. The Pennsylvania has acquired joint running and industrial rights over this line for a distance of 3.22 miles to a connection with the tracks of the Fort Street Union Depot Company. Joint use of this property has also been acquired by the Pennsylvania for entrance to and joint use of the passenger terminal at the corner of Third and Fort streets, within one-half mile of the Detroit city hall.

The route above described comprises the main entrance of the Pennsylvania into the city. Traffic over this line will be developed primarily through the operation of local freight houses and a team yard, on a location immediately adjacent to the Fort street passenger station. The Pennsylvania has acquired all the property bounded by Congress, Larned, Third and Eighth streets, as a site for inbound and outbound freight houses and team tracks. The inbound house will be placed along Congress street, with a width of 80 ft, and a length of 1,080 ft. while the outbound house will be constructed along Larned street, with a width of 67 ft. and a length of 650 ft. The freight houses will be of a two level type with street vehicle space on the street level and tracks on the second floor for a convenient connection with the elevated viaduct entrance to the station. The plans for the inbound freight house also provide for three storage floors above the track floor. Four team tracks will be laid between the two freight houses on the second floor level with a capacity of 90 cars and an inclined approach from Second avenue, across Third avenue. It is expected to build the outbound house this year and use it for both inbound and outbound freight until the traffic warrants the construction of the second building.

The proper handling of the freight business to be developed in Detroit will require facilities for the adequate classification of freight entering and leaving the city. For this purpose, the Pennsylvania has purchased a 300 acre tract just south of the connection with the Wabash at River Rouge for the construction of a large classification yard to be known as the "Ecorse" yard. Plans have been prepared for the development of this area with a yard having an ultimate capacity of 12,000 cars. The immediate construction on this area will be adequate for about 1,100 cars. It is also expected to provide space in this tract for a modern engine terminal but for the present only a temporary wooden house of about three stalls will be provided, it being the intention to run locomotives from Toledo to Detroit and return without the necessity for housing them at Detroit.

The increased utilization of the Fort Street station incident to the inclusion of the Pennsylvania calls for more elaborate round house and coach yard facilities than are now available near the station. To take care of this deficiency the Pennsylvania has purchased 4.6 acres of land adjacent to the present Pere Marquette round house and coach yard, with arrangements whereby the present facilities will be replaced by a new plant to be constructed by the Pere Marquette for the joint use of that road and the Pennsylvania.

In addition to provision for an entrance line and terminals other developments have been made within the city for the purpose of securing ready access to the more important industrial districts. To this end, the Pennsylvania has acquired joint use of all of the Pere Marquette and Wabash tracks within the Detroit industrial terminal area east of the River Rouge, including the Pere Marquette tracks from Delray to a point 1.14 miles north of Michigan avenue, a total distance of 4.39 miles and also of the West Detroit branch of the Pere Marquette from Oak to a junction with the Grand Trunk at Junction avenue, a distance of 8.47 miles. Joint use has also been acquired of the Wabash tracks from Delray to Junction avenue, a distance of 2.63 miles.

Perhaps the most comprehensive feature of the plan has been the development of a belt line, partly by the use of Pere Marquette tracks and partly by the construction of a new line to the north and west, largely through undeveloped industrial property to Livernois avenue, a distance of 6 miles from the junction with the Pere Marquette.

A number of new industries have already located on this line in the vicinity of the Grand River avenue crossing. The Pennsylvania has also constructed a 1½-mile branch from the Pere Marquette to the new plants of the Paige Detroit Motor Company, the Detroit Seamless Tube Company, and other industries. The Pennsylvania has also acquired the right of way for some other branches and has agreed with the Wabash and the Pere Marquette to construct such extensions and improvements for the joint use of the three railroads until expenditures for this purpose are equal to one-half the valuation placed on all the Pere Marquette and Wabash Terminal tracks on which the Pennsylvania has acquired joint use.

Another local development is the provision for a supplementary team yard, on property adjacent to the Detroit Union Depot and Station Company tracks. The Pennsylvania has obtained joint use of all industrial connections on this line and also the yard of the Wabash at Ferdinand street, but supplementing this, purchase has been made of 10 acres along Fort street between Summitt and McKinstry street, to be used for the construction of team tracks with an ultimate capacity of 250 cars. Immediate construction on this site will provide for 95 cars.

Development in Progress for Some Time

The Pennsylvania's entrance into Detroit was started several years ago and considerable progress has already been made. In addition to the construction of the belt line to Livernois avenue, referred to above, considerable work was done on the construction of the Carleton-River Rouge line. In 1918 construction was carried for a distance of 4½ miles from the south end to a bridge over the Huron river which is the largest structure on the line. Some work was also done on the construction of the bridge over this stream which, when completed will consist of four 40-ft. arches. The masonry work was also completed for a bridge under the hump of the Ecorse yard and for a culvert under the tracks at the same point.

This work has now been resumed. A contract has been awarded to Illif Brothers of London, Ohio, for the completion of the grading from the south end of the line to the Huron River bridge, about 15,000 cu. yd. and for the completion of the bridge. A second contract has been awarded to Ferguson & Edmundson of Pittsburgh, Pa., for the remaining portion of the grading to River Rouge and for the completion of the yard. This will involve a total of 350,000 cu. yds. of earth work. The American Bridge Company has been awarded the contract for the steel bridge required at the hump which will carry five tracks.

Following the end of government control, and pending the completion of the Carleton-River Rouge line, the Pennsylvania entered into a supplementary agreement with the Pere Marquette and the Wabash for the use of the tracks of these two roads for passenger service from Toledo to Detroit and this service is now being maintained. The present routing for the Pennsylvania trains is as outlined above under the permanent agreements except that instead of running over the cutoff line now being constructed, the trains run over the Pere Marquette to a junction with the Wabash at Romulus and thence over the latter road to Delray. This arrangement will terminate as soon as the new line is completed.

The various construction projects involved in the general plan for the Detroit Terminal of the Pennsylvania are being developed under the direction of B. V. Sommerville, chief engineer of the Pennsylvania-Detroit Railroad, Detroit, Mich.

Wage Cut Order Induces Bitter Controversy

Dissenting and Supporting Opinions in Labor Board's Latest Decision Indicate Trouble Ahead

REDUCTIONS IN the rates of pay of clerical and station forces, stationary engine and boiler room employees, signal department employees and miscellaneous employees not specifically included in any one of these groups were ordered by the Railroad Labor Board on June 17, to become effective July 1. The schedule of decreases as promulgated by the Board was given in last week's *Railway Age*, page 1504. New rates for telephone switchboard operators of $85 a month with provisions for the maintenance of existing higher rates were also announced by the Board, but inadvertently omitted in the schedule given in the *Railway Age* last week.

In discussing the new rates of pay the Board, in its decision, said in part:

After careful consideration of the evidence submitted, the Labor Board is of the opinion that the nature of the work and the responsibility of train dispatchers to the carriers and to the public, coupled with due consideration of the other factors set out in the Transportation Act, are such as to warrant the maintenance of the present rates. Of the 134 carriers covered by this decision only 26 are asking reductions in pay for the train dispatchers.

There are only four carriers asking for a reduction in the compensation of dining car stewards, and, after full consideration of the law and the evidence bearing on the matter, the Board has concluded that the present rate on these carriers should not be reduced.

For similar reasons, no reduction is made in the pay of the employees represented by the Marine Culinary Workers' Association of California.

In the case of the floating equipment employees, disputes are before the Labor Board from only four carriers, and these affect only a portion of the entire class. Presumably, the other carriers which have employees of this class have reached a satisfactory wage agreement with such employees. The Board has, therefore, remanded these disputes to the four carriers and the employees in question in order that further negotiations may be had and, if possible, an agreement reached.

It will be noted that telephone switchboard operators, previously shown in Section 5 of Article II (Decisions Nos. 2 and 147), are now placed in a separate section. It was the continuation of a mistake originating during Federal control which placed these employees in said section. As this mistaken location of telephone switchboard operators gave them a smaller increase under Decision No. 2 and a larger decrease under Decision No. 147 than many of the clerks received, the Board has, to a certain extent, created an offset by fixing the minimum wage at $85 per month, with the understanding that the wages of switchboard operators that may be higher than that amount are not to be reduced.

The reduction made for clerical employees are lighter than for some other classes, because this class suffered considerable loss as a result of certain changes in their rules and because they have never been highly paid compared with other classes. It will be noted that a greater reduction has been fixed by the Board for clerks with experience of one year and less than two, than for clerks with experience of two years or more. The reason for this is that the majority of junior clerks are beginners and apprentices and have not as yet assumed family responsibilities, and many of them are still living with their parents.

Common labor in and around stations, storehouses and warehouses was reduced one cent less than similar labor in the maintenance of way department because a much greater percentage of this class live in large towns and cities, and consequently incur a higher cost of living. Moreover, many of the common laborers in the maintenance of way department are furnished living quarters by the carriers free of charge or at a low rate.

In the light of all the facts the Labor Board is of the opinion that there should be no reduction in the rates of the supervisory forces of the signal department employees, but that their duties and responsibilities are of such character as to warrant the present rates.

In deciding upon the reductions of employees of the signal department covered by Sections 2, 3 and 4, Article IX of Decision No. 147, due consideration was given to the similarity of these employees and the shop crafts, but a smaller reduction was considered advisable in the case of the signal department employees because their rule as to the payment of punitive overtime is much less favorable than that of the shop employees.

Labor Board Discusses the Problem of Wage Fixing

Under the heading of "General Observations" the Board appended a discussion of the present labor situation and the conditions under which wage fixing must, of necessity, be carried on. After citing Section 307 of the Transportation Act, containing the seven relevant factors which should be considered in fixing just and reasonable wage scales for railway employees, the Board said in part:

Besides the specific elements or factors mentioned, the Act provides that the Board in determining wages shall consider "other relevant circumstances." Referring to this language, "other relevant circumstances," the Board in Decision No. 2 said:

"This, it understands, comprehends, among other things, the effect the action of this Board may have on other wages and industries, on production generally, the relation of railroad wages to the aggregate of transportation costs and requirements for betterments, together with the burden on the entire people of railroad transportation charges."

The consideration of all these matters presents, and has presented ever since the Government handed the roads back to private management, the most complex labor problem ever imposed upon a public tribunal.

The artificial conditions that had been built up during the war around every business and industry in this country were particularly accentuated in the case of the railroads by reason of their tremendous importance in the conduct of our country's military operations, which resulted in federal control. The difficult problems inherited from the war period by every industry were enormously multiplied and magnified in connection with railway transportation. The labor problems of this industry were more complicated than those of any other industry and involved vastly more to the public.

In this post-war period of readjustment, with its fluctuating conditions, its inflated and profiteering prices, its high cost of living, and its extravagance and wastefulness, the readjustment of wages for two million men in the country's most essential industry has been a task of appalling magnitude.

Add to these conditions the pressure of an unsettled, discontented, and sometimes misinformed public sentiment, harassed by high freight rates, the vigorous and insistent appeals of the railroads for financial help, and the zealous desire of powerful labor organizations to protect what they conceived to be the rightful interests of the employees, and the task has not been diminished.

Surrounded by such abnormal conditions, the Labor Board has not been permitted to deal with the question of what constitutes just and reasonable wages and working conditions in the same undisturbed and uncomplicated manner as would have been possible in normal times. And, yet, the wisdom and justice of settling these questions by adjudication rather than by industrial war have been demonstrated, both from the standpoint of the parties and the public. While it can not be said that no mistakes have been made in the awards handed down by the Labor Board, a substantial degree of social and economic justice has been attained and that without the enormous loss and suffering to the carriers, the employees, and the people at large, necessarily resultant from settlements by force.

The extreme utterance of partisan bias to the effect that the Board does not give full consideration to the evidence submitted to it would be discouraging were it not for knowledge of the fact that such utterances evince merely a spasmodic relapse into the old system of bluff and bluster that entered so largely into the adjustment of railway labor disputes before adjudication supplanted force.

The Labor Board cannot venture too far into the realms of economic prophecy, but it is generally conceded to be fairly plain and certain that our country has entered upon an era of gradually increasing business prosperity which will be liberally shared by the carriers. That the carriers shall have a fair opportunity to profit by the revival of business in order that they may expand their facilities is absolutely indispensable to their efficient service to the American public. Their unpreparedness now to cope with any greatly increased traffic is notorious. Every facility of rail-

way transportation has been skimped for the last several years, and, as to mileage, there has been an actual decrease instead of an increase.

This statement, in the connection used, must not be misconstrued to mean that the employees should be called upon to bear the cost of railway rehabilitation, improved service and reduced rates. It simply means that it is only patriotic common sense and justice that every citizen, including the railway employee, should co-operate in a cordial spirit, should bear and forbear, until the carriers are back on their feet.

When this accomplishment is safely under way, it will then be possible for the Railroad Labor Board to give increased consideration to all the intricate details incident to the scientific adjustment of the living and saving wage, with enlarged freedom from the complications of the "relevant circumstances" of the abnormal period which is now approaching its end.

Labor Is Not a Commodity

In this connection it should be said that the Labor Board has never adopted the theory that human labor is a commodity to be bought and sold upon the market, and, consequently, to be reduced to starvation wages during periods of depression and unemployment. On the other hand, it is idle to contend that labor can be completely freed from the economic laws which likewise affect the earnings of capital.

That the Board has never fixed wages upon a commodity basis has been amply demonstrated during the past year by the ease with which the carriers have obtained labor under the contract system for less than the wage established by Decision No. 147.

In this connection it must be remembered that the carriers are at liberty to pay to any class of employees a higher wage than that fixed by this Board whenever the so-called labor market compels, provided, as the Act states, that such wage does not result in increased rates to the public.

The Purchasing Power of Railway Employee's Wages

The average hourly earnings and their purchasing power as applied to certain classes of employees covered by this decision, are shown in the following tables:

Table headings	Time for which figures are shown or comparisons made.	Clerks (Group I, Secs. 1 and 2a).	Common labor, station stores (Group I, Sec. 9).	Signalmen, maintainers and assistants (Group III, Sec. 3).	Stationary firemen and engine room oilers (Group II, Sec. 2).
Average hourly rates..	Dec., 1917.....	34.5c.	22.3c.	32.8c.	21.8c.
	Jan., 1920.....	54.5c.	43.6c.	64.3c.	46.6c.
	May, 1920.....	67.5c.	52.1c.	77.3c.	59.6c.
	July, 1921.....	61.5c.	43.6c.	69.3c.	51.6c.
	Under this Dn.	58.5c.	39.6c.	64.3c.	49.6c.
Percentage increase in average hourly rates over Dec., 1917.....	Jan., 1920.....	58.0%	95.5%	96.0%	113.8%
	May, 1920.....	95.7%	133.6%	135.7%	173.4%
	July, 1921.....	78.3%	95.5%	111.3%	136.7%
	Under this Dn..	69.6%	77.6%	96.0%	127.5%
Increase in cost of living over Dec., 1917.	Jan., 1920.....		40.0%		
	May, 1920.....		52.0%		
	July, 1921.....		26.7%		
	Mar., 1922*		17.2%		
Percentage increase in purchasing power of earnings of subsequent dates compared with Dec., 1917.....	Jan., 1920.....	12.9%	39.6%	40.0%	52.7%
	May, 1920.....	28.8%	53.7%	55.1%	79.9%
	July, 1921.....	40.7%	54.3%	66.8%	86.8%
	Under this Dn.	44.7%	51.5%	67.2%	94.1%
Decrease in hourly rates under present decision compared with Decision No. 2.	.....	9.0c.	12.5c.	13.0c.	10.0c.
Percentage increase in purchasing power of present earnings compared with those under Decision No. 2.	.....	12.3%	—1.4%	7.8%	7.9%

— Decrease
* Latest available Government data.

Owing to the manner in which the carriers were required to render their reports to the Interstate Commerce Commission during December, 1917, in which wage data covering heterogeneous classes of employees were grouped rather than separated in accordance with their duties, responsibilities, experience, et cetera, it is impossible to obtain actual figures from which average hourly rates for the above classes could be computed. The figures shown above for December, 1917, are therefore approximations, although assumed to be very close approximations. For this same reason it is impossible to separate the average rates of clerks between those in Section 1 and Section 2 (a), and the rates shown above are the averages for all clerks in these two classes.

The average rate for common labor for December, 1917, is perhaps a little high due to the fact that the carriers reported all station service employees in one group, and the rate shown herein for December, 1917, is the average for the group.

The foregoing table prepared by the statistical force of the Labor Board is based on the cost-of-living figures issued by the United States Department of Labor.

These figures show that applying the wages fixed by this decision to the present cost of living, the purchasing power of the hourly wage of the respective classes here named has increased over the purchasing power of the hourly wage of December, 1917 (prior to federal control), as follows:

	Per cent
Clerks	44.7
Common labor, around stations, etc	51.5
Signalmen (maintainers and assistants)	67.2
Stationary firemen and engine room oilers	94.1

The table also shows that with one slight exception the purchasing power of the hourly wage of each class of these employees is greater under the present decision than it was under Decision No. 2 which granted the 22 per cent increase.

The Attitude of the Board Toward Budgets

The Labor Board has given careful consideration to the testimony bearing upon family budgets and standards of living. That existing standards will not be lowered by this decision is shown with substantial satisfaction by the above statistics.

This matter of living standards constitutes an interesting and important study, but much that is said on the subject is highly theoretical and of but little value.

When the Railway Employees' Department presents figures to show that the sum of $2,636.97 is necessary for the minimum comfort budget of the average family, it has propounded an economic impossibility.

It is stated upon authority that the total income of the people of the United States is now but little more than $40,000,000,000. If the 25,000,000 families of this country were expending for living costs the sum of $2,600 each, it would total $65,000,000,000 which would be $25,000,000,000 in excess of the country's total income.

Of course, living costs can not be standardized any more than men can be standardized. One man will consume his income and find himself continually in debt while another man with the same income and under identical conditions will live in equal comfort and accumulate savings. In this connection, it can hardly be considered a digression or a gratuitous preachment to say that one of the principal troubles with the people of this country today is the abandonment of the old-fashioned ideas of thrift and economy and the indulgence in wastefulness and extravagance. These loose habits of living were acquired during the inflated period engendered by the war and, like many other ills of similar origin, are slow to depart. Increased expenses do not always mean a higher standard of living nor do diminished expenses necessarily mean a lower standard of living.

In the settlement of these questions, it is the profound desire of the Labor Board to do justice to the parties directly concerned, placing the human and social consideration above the purely economic, and, finally, to establish wages and conditions that will largely meet the hopes and aspirations of the employees, that will prove satisfactory to the carriers, and that will impose no unnecessary burdens on the public. This is not a Utopian conception in America.

Two Labor Members Append Bitter Dissenting Opinion

A dissenting opinion signed by A. O. Wharton and Albert Phillips, two of the three labor representatives on the Board was attached to the decision and contained a bitter denunciation of the majority's decision.

Unlike previous dissenting opinions in the recent controversy over wage reductions, this opinion was not signed by W. L. McMenimen, the third member of the labor group on the Board. The reason given at the Board's headquarters in Chicago is that Mr. McMenimen left for the east on official business prior to the time this dissenting opinion was written.

Mr. Wharton and Mr. Phillips outlined five specific reasons for their dissent as follows:

1. The bases upon which the decision rests are not in themselves sufficient to justify the action taken. The Labor Board has gone into considerations which affect the issues only indirectly, if at all, and has ventured upon ground which indicates a very free interpretation of the "other relevant circumstances" provision in the Transportation Act. It has considered the effect of its decisions upon wages in other industries, extending its own "sphere

of influence" beyond the transportation industry. It has taken into consideration that part of the duties of the Interstate Commerce Commission which has to do with railway profits, and the need for railway expansion. It has considered the effect of rates charged shippers, and then decided what wages should be paid the railway workers.

2. The reasons offered for the decisions not only go far beyond the provisions of the Transportation Act, but they also deny the validity of one of the specific provisions contained in the Act. The cost of living is brushed aside, because the only basis upon which it can be computed is a more or less hypothetical budget. If the introduction of external considerations is difficult to justify, then the exclusion of a vital section of the law under which the Board operates is a matter calling for most expert casuistry. The condemnation of the use of cost-of-living budgets amounts to a rejection of a method found practical by other governmental agencies, and a fundamental disagreement with the United States Department of Labor.

3. The wages as now fixed do not insure the continuance of previous standards of living. The statement that the wages constitute an improvement over 1917 does not take into account the very low standards then prevailing, nor the much higher standards of earlier and later periods. It selects the year which, of all those for which data is available, puts the workers' standard at the lowest point. The use of 1917 figures to justify new reductions is neither just nor reasonable.

4. The basing of wages upon rates paid in outside industries, one of the "relevant circumstances" referred to in the Transportation Act, does not provide reason for the reductions made by the Board at this time. Insofar as any evidence was introduced into the hearings upon this point, especially with reference to employees covered in Group I of Article I, it seemed rather to call for a wage increase than a decrease.

5. The wages fixed by the majority decision are such as to condemn these railway workers to lives of extreme poverty. It is too much, perhaps, to expect that the full meaning of this action should be clear to men not in close contact with the workers. It may be asking too much to urge that human life is in a class by itself, not to be listed indifferently among the costs of transportation. But certainly it may be fairly and rightfully expected that the social cost of poverty is enough to induce a public body to proceed most cautiously in reducing the standards by which the workers must live. The wages most recently determined are in some cases less than 50 per cent of the amount needed for a fair standard of living. Maintenance and expansion costs of the railways must be paid, and with the "cordial" and "patriotic" cooperation of the workers; the "maintenance costs" of the workers are considered "theoretical," when they are considered at all. Such is the basis for the series of wage decisions now being made.

The Case Against the Majority Decision

There followed a 35-page argument in support of these contentions, the extreme length of this material making its reproduction here impossible. However, the character of the statements made and the tone of the whole opinion is illustrated in the following excerpts which have been taken from it:

The lack of any statement which might indicate that human beings are to live narrower lives by virtue of the decision handed down, is a clear indication that the majority has taken over the typical employer's approach to the problems of the working man. Despite the magnanimous statement that human labor is not a commodity, there seems to be very little basis for saying that it has not been so considered. Lengthy statements dealing with transportation costs, economic laws, "the vastness of the problem," and "fair opportunity to profit," can mean but little to the worker faced with the necessity of providing food and clothing for his family. If American workers are entitled to "life, liberty and the pursuit of happiness," it should surely be part of the responsibility of government to patriotically insure that the pursuit shall not be carried on at a hopelessly long distance.

It is said that "every facility of railway transportation has been skimped for the last several years," and it should not be thought facetious to remark here that if the railway workers had been given the generous consideration accorded those facilities, something of the skimping going on under thousands of American roofs might have been eliminated.

We have already pointed out, in the dissenting opinions in the maintenance of way and shop crafts cases, that by any standard ever set up the wages fixed by the Railroad Labor Board are insufficient; that is as true of the rates set in the latest decision. The workers will be forced, in the event that these decisions stand, to exist on a level even lower than the "slave-owners' standard." When human beings were considered chattels, they were cared for well enough to prevent physical deterioration. The food and clothing now allowed to the workers will not provide enough of the basic necessities of life to keep up health and strength. The slave-owner had an investment, and his business judgment urged the advisability of preventing its depreciation. There is no such limit to the employer today; now workers are always available to take the place of those broken by the combined pressure of over-work and under-nourishment. Human depreciation does not find its way into the railroad balance sheet.

Human Factors in Wage Decisions

The vital question in wage determination has again been ignored in the decisions now rendered. The Railroad Labor Board is not a profit-regulating body, nor a tariff-fixing body; it has not to deal with abstract considerations of commodity schedules or the earning power of an over-capitalized road. Wage-fixing has to deal with human values, with the lives of men, women and children. The power to set wages is the power to shape the life of the worker affected.

No other "relevant circumstance" can be greater than this. Human life must be given precedence over every other consideration. A body charged by the government with the responsibility of wage fixing should have as its primary standard the relation of its action to the lives of the workers concerned.

To explain a wage cut on the plea that workers in other, and unregulated, industries are as poverty stricken, is matched only by the excuse that at one time in the past the workers concerned have led a more precarious existence than that now prescribed. Neither of these reasons can even partially absolve the Board for its failure to consider the living conditions it has set for the railway employees.

The decision of the Labor Board has not only these humanitarian aspects; it is not only the demands of justice and humanity, sufficient though they should be, that condemn the utterly inadequate standards set for the workers. If a proper respect for human life were not in itself enough to motivate the fixing of a living wage for the railway employees, then, at least, a wise public policy, based on the measurable effects of poverty, should have dictated a standard higher than the one established. Some public officials are passing laws to punish and restrain criminals; other public officials are fixing wages that must multiply crime. Public health organizations try to eliminate disease; wage fixing bodies lay down living conditions that mean overcrowding, undernourishment, inadequate clothing—breaking down the power of the worker and his family to resist disease, and inevitably raising the mortality rate among the thousands of people affected. Clergymen, philanthropists, lawmakers and sociologists work with every means at hand to lessen child labor; the Railroad Labor Board fixes the wage of the parents at a point where the children must be taken from school and must themselves seek employment. One section of society works through every available agency to remedy social conditions; another, supposedly responsible to the same influence, compounds the evils growing out of the poverty of the wage earners.

Majority Admit Inability to Give Just Wage

As pointed out by President Willard of the Baltimore & Ohio in the words which we embodied in our previous minority opinion, the Transportation Act aimed to substitute for the strike such just and reasonable wages as would render resort to a strike unnecessary. If this tribunal, created to determine such wages, admits that under existing circumstances it cannot fulfill this function, obviously, the employees must use such power as they have to influence the labor market, which is henceforth to be the determining factor in their wages. The majority state clearly that—

"* * * the Labor Board has not been permitted to deal with the question of what constitutes just and reasonable wages and working conditions in the same undisturbed and uncomplicated manner as would have been possible in normal times."

Such statement is an admission on the part of the majority that they have been unable to separate themselves from the partisan struggle long enough to perform the function for which they were appointed and consequently it tends to absolve the employees from any limitations which the existence of a judicial board was intended to impose. As a matter of fact, the Labor Board has had nearly two years in which to make such studies as we feel to be essential to the establishment of the just and reasonable wages required by the Transportation Act.

The correctness or incorrectness of the deduction of the majority as to the present conditions of the carriers or as to their crying need for profits is unimportant because the whole matter is irrelevant to the consideration of just and reasonable human standards, which, according to Senator Cummins, is the special function of the Labor Board.

The majority attempt to avoid the implication of their announced basic consideration by the comment:

"This statement, in the connection used, must not be misunderstood to mean that the employees should be called upon to bear the cost of railway rehabilitation, et cetera."

In order to harmonize the statement just quoted with the rates

of pay which will result from these decisions, the majority are forced to add a hasty qualification which amounts to a contradiction of the assertion. It is to the effect that the railway employees must—"bear and forbear, until the carriers are back on their feet."

Interpreted in terms of rates of pay awarded, this can mean nothing unless it means that railway employees must bear with unjust wages until the carriers are willing to admit they have secured the rehabilitation which they demanded.

The meaning of the majority is clarified by the statement which follows:

"When this accomplishment (the rehabilitation of the carrier) is safely under way, it will then be possible for the Railroad Labor Board to give increased consideration to all the intricate details incident to the scientific adjustment of the living and saving wage * * *."

The employees may well consider this an ultimatum to the effect that justice to them and their families, a real consideration of their human needs, must await complete satisfaction to ownership. In their assertion the majority admit all that we have pointed out in our former opinions; they admit that they have not considered the matter on its merits, but have been driven along by the necessities of the carriers. And they have taken as the measure of those necessities, not a balanced view of the evidence offered by the parties to the case, but the extreme statements of one party in its propaganda.

At least, the vagueness is cleared. The public and the employees know that a full consideration of the merits of the case from the employees' standpoint must await the prior claim of increased profits demanded by the railroad owners. Any one viewing the rates of pay established for the great army of labor knows that such rates are practically the same as those paid in industries where labor is treated as a commodity. So the majority hasten to assert that "the Labor Board has never adopted the theory that human labor is a commodity." The majority, however, in the next sentence admits the influence of the market value of labor upon its decision by the statement that—"It is idle to contend that labor can be completely freed from the economic laws which likewise affect the earnings of capital."

This in the opinion of the minority, is a very important qualification, for, in the first place, it places the livelihood of human families, the provisions for children who will form the coming generation, in the same impersonal category as profits. And in the second place it immediately sweeps away all the sentiment about identity of interest between employers and employees. This, the decision does, not only here, but throughout its entire text.

In other words, the employee will ask "what is it that is preventing me from receiving enough to support my family in decency?" He will look to the decision and answer "profits—the need of the railroad for profits." The economic laws which the majority feel to be so unchangeable are neither God-given nor man-made. They are simply a description of the way in which business and industry has worked to date, and it has worked out very badly for human life. The results appear in the high infant mortality rates in the majority of centers of industry.

These so-called economic laws create a situation in which the lowest wages for which the requisite skill and industry can be bought are considered good for capital and bad for labor. Hence, the struggle, which the majority decries, has been a mere expression of the so-called economic law, and it will continue unless adjudication by a scientific tribunal can adopt methods which will amount to establishing new laws. These new laws must mean a response to something other than manipulation by interests with varying degrees of control in the market.

Board Charged With Being Tool of Railroads

The majority give the carriers specific permission to adjust rates, as follows:

"In this connection it must be remembered that the carriers are at liberty to pay any class of employees a higher wage than that fixed by this Board, whenever the so-called labor market compels, provided, as the Act states, that such wage does not result in increased rates to the public."

Employees will take this as a permission to go out and get such wages as they can command. If they feel that they can command higher wages by withholding their services, either separately or in numbers, that will not be a strike against the order of the Board; it will merely be the carrying out of the Board's suggestion as to the method of wage adjustment about to come.

But the real conclusion from this statement, coming at the beginning of a new period of prosperity, will naturally be that the carriers had the Labor Board created to regulate labor during the critical period just coming to an end. Under its cover, they were able to carry through a program which would have been impossible without the practical prohibition of striking. Whenever the Board decided in favor of the employees, the roads either defied the Board or found some method of evasion.

The majority of the Board are, then, in a thoroughly insecure position, when they must depend for justification of their decisions upon principles which either contradict the clear purpose of the Act under which the Labor Board is created or upon misinterpretation of fact. It is the opinion of the minority that such pitfalls could be avoided by a clear, sincere attempt to approach the problem of wages from the point of view of the humble worker who must spend his wages to support his family. Wage adjustment will be theoretical until statesmen appear with enough human sympathy to place themselves in the other fellow's position.

Majority Reply to Dissenting Opinion

A reply to the statement of the minority in the dissenting opinion was also appended to the decision. An abstract of this reply follows:

It is not incumbent upon the six members of the Board concurring in this decision to follow the minority into a partisan controversy which partakes more of the characteristics of impassioned advocacy than of calm adjudication.

Insofar as the dissenting opinion distorts the sentiments of the majority, misquotes their language and reflects upon their desire and disposition to do justice, we will refrain from comment. We prefer to believe that these improprieties crept into that part of the document which was drafted by the employees in the headquarters of the Railway Employees' Department of the American Federation of Labor, and that they were overlooked by the dissenting members. As an example of the looseness with which the statements of the decision were handled in the dissenting opinion, reference might be made to the following quotation from the dissent:

"In this decision, as in the preceding ones, the Labor Board announces that 'in its opinion' wages are still above those paid in outside industries."

As a matter of fact, the statement in question is not contained in this decision.

There is one feature of the dissenting argument, however, which is so unusual that it should not be passed over without notice, and that is the portion wherein the two dissenting members advise the employees to strike against the decision of the Board.

It is quite natural for the representatives of labor on the Board to resist all reductions in wages. This course is in harmony with the reductions in the year 1921, as well as those of the present year.

It is something new, however, for labor members of the Board to issue incendiary arguments to employees in favor of striking against a decision of the Board. The giving of advice of this kind has heretofore been left to outsiders, who were not under the official obligations imposed by the Transportation Act, the main purpose of which is to prevent railway strikes and protect the public from their dire effects.

One of the passages referred to is as follows:

"The Transportation Act aimed to substitute for the strike such just and reasonable wages as would render resort to a strike unnecessary. If this tribunal created to determine such wages admits that under existing circumstances it cannot fulfill this function, obviously, the employees must use such power as they have to influence the labor market, which is henceforth to be the determining factor in their wages."

That is to say, if the Board makes such admission, the employees must strike.

Then the dissenting members proceed to remove the "if" and to assert that the Board has made the admission which renders a strike necessary. After quoting a statement from the decision of the majority, which was separated from the context for the purpose, the dissenting opinion proceeds as follows:

"Such statement is an admission on the part of the majority that they have been unable to separate themselves from the partisan struggle long enough to perform the functions for which they were appointed, and consequently it tends to absolve the employees from any limitations which the existence of a judicial board was intended to impose."

Not only do the minority step down from the judicial position, which they occupy, to advise a strike, but they obviously distort and misconstrue the language of the majority in order to provide the condition which they pronounce a justification.

This is not the only place in the dissenting opinion where the suggestion is made to the employees to strike.

No Injustice to Employees

As a matter of fact, the entire dissenting opinion constitutes a strained and exaggerated effort to inflame the employees by the belief that they have been grossly outraged by this decision.

A fair statement of the facts will convince any disinterested man that no injustice has been done to these employees by the present decision, and that the decrease in their wages is conservative and is based upon the law and the evidence.

The Relevant Circumstances

In the decision, the majority quoted from Decision No. 2 what the Board there said in regard to the "relevant circumstances" referred to in the Transportation Act. No detailed comment was made on the quoted matter. The minority in their dissent savagely attack the statements so quoted from Decision No. 2, and, in effect, over-estimate any consideration that the majority may have

given any portion of it. And yet, the records of the Board show that the dissenting members voted for the adoption of the decision containing the language in regard to "relevant circumstances," and they did not seek to exclude it. This, be it remembered, was a decision increasing wages 22 per cent and the present minority were then of the majority. It would, therefore, appear that the relevant circumstances mentioned were to be considered by the present dissenting members in relation only to wage increases but not decreases.

The Purchasing Power of Wages

The dissenting members criticize the tables offered by the majority to show the trend of the purchasing power of the wages of the employees covered by this decision, on the ground that the year 1917, is an unfair year to adopt as a basis or starting point. The inference is rather plainly drawn that the selection of said year was the result of a deep and sinister design on the part of the majority. This suggestion is far-fetched, as the dissenters are well aware that the wage reports of this Board have begun with the year 1917, and both of them have twice concurred in this arrangement. It was therefore a natural course for the Board to make use of the wage series which it had prepared and published.

The minority suggest that either the year 1914 or 1915 should have been adopted as the basic year for these tables.

The year 1914 can not be safely adopted, because the carriers then reported their clerical forces in groups and classes different from the method since used, beginning with 1915. The use of the year 1914 as the basic year would admittedly require the making of an estimate, the accuracy of which would necessarily be doubtful. If the figures for the basic year were doubtful, then those for all subsequent years would be of uncertain accuracy and value. We will therefore adopt 1915, the other year pronounced satisfactory by the minority, and will demonstrate indisputably the changes that have taken place in the wages of these employees and in the purchasing power thereof, based upon the Bureau of Labor Statistics as to living costs.

The following table was prepared by the statistical force of this Board at the request of the minority and furnished to them, but does not seem to have suited their purpose, as it was not used. The increases in purchasing power of earnings under the present decision over 1915 are as follows:

PERCENTAGE OF INCREASE IN PURCHASING POWER OF EARNINGS UNDER PRESENT DECISION OVER 1915

	Per cent
(a) EMPLOYEES IN GROUP I.	
Supervisory clerks and clerks with experience of two years or more	8.8
Clerks with experience of one year and less than two years	1.1
Clerks with less than one year experience	4.2
Train and engine crew callers, train announcers, gatemen, baggage and parcel room employees	15.0
Office boys, messengers, chore boys and others under eighteen years	2.0
Janitors, elevator operators, watchmen, employees assorting waybills etc.	1.4
Freight handlers and truckers	17.5
Sealers, scalers and fruit and perishable inspectors	20.2
Stowers, stevedores, callers or loaders, locators or coopers	22.9
(b) EMPLOYEES IN GROUP II.	
Stationary engineers (steam)	70.0
Stationary firemen (steam)	42.1
Boiler room water tenders	25.9
Engine room oilers	42.1
Coal passers, boiler room	25.9
(c) EMPLOYEES IN GROUP III.	
Leading maintainers, gang foremen and leading signalmen	5.0
Signalmen, signal maintainers, assistant signal men and assistant signal maintainers	6.5
Helpers	12.7

The foregoing table is based on the flat daily rate.

The statistician of the Board has worked out a table based upon the Interstate Commerce Commission's reports of the average monthly earnings of all clerks from the year 1915 to the last six months of 1921 and has used hours worked by this class in the last six months of 1921 to determine a rate under the present decision. This table is given below. It is also tied up with the cost of living index number in order to reflect a trend of standard of living. From these figures it will be seen that the standard of living for all clerks under the rates prescribed by the present decision is 12.1 per cent above 1915:

COMPARISON OF LIVING COSTS AND WAGES OF RAILWAY CLERKS, 1915-1921, SHOWING CHANGES IN STANDARD OF LIVING.

Period	Average monthly earnings	Index number average earnings	Cost of living index number	Standard of living index number
Year 1915	69.36	100.0	100.0	100.0
Year 1916	73.55	106.0	112.5	94.2
Year 1917	77.65	111.9	135.5	82.6
Year 1918	102.60	147.9	165.9	89.1
Dec., 1919	114.59	165.2	189.6	87.1
Fourth quarter, 1920	145.91	210.4	190.7	110.3
Last 6 months, 1921	131.58	189.7	165.8	114.4
Last 6 months at new decision rates	123.45	178.0	*158.8	112.1

*March, 1922.

This 12.1 per cent increase in the standard of living of clerks in the last seven years, based on an increase in wages of 78 per cent and an increase in living costs of 58.8 per cent indicates remarkable progress. This class of employees should feel that their official representatives have rendered them notable service in the effectuation of this result. It certainly affords grounds for satisfaction and encouragement rather than for inflammatory appeals for strikes.

There is no class of labor covered by this decision to which the dissenting discussion of pauperized labor with its physical and social deterioration and its propagation of crime has any application.

Theoretical Living Standards

It appears that a portion of the employees covered herein have presented a family budget of $2,636.97, and others have offered a family budget of $2,133. The latter is presumably based on the budget set out in the December, 1919, Monthly Labor Review, published by the U. S. Bureau of Labor Statistics, as the dissenting opinion quotes at length from that publication the Bureau of Labor's explanation of the budget. This quotation is prefaced by the statement: "It (the budget) is described by the Bureau of Labor Statistics as follows." With this identification of the budget used, we desire to quote another passage from the same article as follows:

> "This report presents the results of a study made by the United States Bureau of Labor Statistics to determine the cost of maintaining the family of a government employee in Washington at a level of health and decency."

Let the significant fact be noted that the budget is for a government employee in Washington and that, when Washington was the most congested city in the United States with an abnormally high cost of living, as a result of the great temporary increase in population resulting from the war expansion of all governmental departments.

Whether the budget of $2,133 is identical with that set out in said government publication as it purports on its face to be or whether it is one of the several other budgets heretofore submitted to the Board, the figures are practically the same as those in the government publication, the latter being $2,288.25.

The dissenting members seem to have temporarily abandoned their budgets of $2,636.97.

In the decision in this case, it was shown that this budget of $2,636.97 if given to every family impartially would require a sum twenty-five billion dollars in excess of the total income of all the individuals and industries in the United States.

The budget of $2,133 now relied upon is open to the same fatal criticism.

If the country's 25,000,000 families were guaranteed an income of $2,133, the total income of the entire country would be exceeded by the sum of $13,225,000,000.

In the fact of this absurdity, page after page of the dissenting opinion is devoted to an attack on the Board's decision upon the ground that the wages fixed for some of the employees do not reach the amount of this mythical, visionary budget. The advanced purchasing power of the railway employee's wage, the relative great increase of that wage, the improved social and economic condition of the employee are all ignored, and a vitriolic denunciation of the Board's decision is indulged in because every individual employee is not granted this impossible sum of money.

Let us see what would be the result of adopting either of these budget theories on the railroads and requiring that no employee should receive less than $2,133, according to one contention, or less than $2,636.97, according to the other. The following table throws light on this question:

Total revenue of roads, 1921	$5,509,035,259
Increase in aggregate pay of employees if minimum wage, $2,636.97, were paid on basis of Decision No. 147	1,834,778,865
Increase in aggregate pay of employees if minimum wage, $2,133, were paid on basis of Decision No. 147	1,063,081,640

The net income of the carriers for two other years prior to the war was as follows:

1914	$673,611,198
1915	697,185,309

It is quite obvious, that the net income of the roads for the years named, and, it may be added, for any other year in history, would have been consumed by the recognition of either of the above budgets, and the carriers would have shown a loss of hundreds of millions of dollars each year. The shortage would have had to be paid by some form of taxation on the public, presumably, freight rates, which would have added to the burdens of every individual in the country, rich and poor.

In this connection, it is interesting to note that the dissenting opinion finds fault with the majority decision, because it states that "it is idle to contend that labor can be completely freed from the economic laws which likewise affect the earnings of capital."

The soundness of this axiomatic proposition is right well exemplified by the theory of the minority above discussed that no wage can be made so high as to constitute an unbearable burden on an industry. Because those concurring in the decision recog-

nize the existence of some of the old-fashioned economic laws quite familiar to the ordinary business man, those dissenting affect to believe that the majority place the consideration of profits above the welfare of the workers. This is a gratuitous assumption. This Board has never taken the position that the claims of the employees for a just and reasonable wage must await the prior demands for increased profits, nor does it take such position in this decision. It is a waste of time to make detailed defense to all these overdrawn and imaginative assertions.

It is well enough to remember, however, that the time will never come in this country or any other country when the ordinary rules of common sense and business, call them economic laws, if you wish, can be absolutely ignored in the conduct of any industry. The latest instance in which these laws have been thrown overboard and replaced by fine-spun socialistic theories, both in railway and other industries, is found in Russia, and the result there is not one that this country desires to emulate.

The minority are sowing some of the tiny seeds that have germinated and blossomed into industrical anarchy in Russia, when they make such statements as this: "They (the economic laws) are simply a description of the way in which business and industry has worked to date, and it has worked out very badly for human life."

It will be readily conceded that our social and industrial system has not invariably produced perfect results, but, upon the whole, it has demonstrated its superiority to every experimental substitute that has been oeffed. And the fact must not be overlooked that this great industrial republic has rewarded labor with its largest degree of liberty, prosperity and happiness. It it well not to hold its minor imperfections so close to the eye as to obscure its benefits.

Permission to Adjust Rates

The dissenting opinion stated that the decision gives the carriers specific permission to adjust rates, because it says that the carriers are at liberty to pay higher wages than those fixed by the Labor Board.

The Board did nothing of the kind. It gave the carriers no permission to adjust rates. There is nothing in the Transportation Act that prevents a carrier from paying higher rates, unless such higher rates would result in increased rates to the public. The statute contemplates that the carrier would not have to coerce the employee into the acceptance of a higher rate. This does not mean that the Labor Board construes the Transportation Act to mean that the carrier may impose a lower rate on the employees or the employees impose a higher rate on the carrier.

The suggestion by the minority that the employees will take this as permission to "go out and get" such wages as they can command is entirely absurd. If they should do so, it would be the result of the minority's suggestion and not of the language of the decision.

Finally, let it be reiterated that the majority, in arriving at this decision, considered every phase of the evidence and provision of the Transportation Act, and that their minds rest easily upon the reasonableness and justice of their conclusions, in the light of all the circumstances and conditions shown to exist at this time.

Recent Developments Put Damper on Strike Talk

Although talk of a strike of those classes of railway employees whose wages have been reduced by the last three orders of the Labor Board still continues, several recent developments have tended to allay the enthusiasm for a strike at this time. The first of these developments came in the form of an announcement by E. H. Fitzgerald, president of the Brotherhood of Railway & Steamship Freight Handlers, Express and Station Employees that there would probably not be a general strike of the members of his organization.

"We are not going to put out any general strike ballot," Mr. Fitzgerald was quoted as saying. "We have agreements with the Southern; the Chicago, Burlington & Quincy; the Chicago & Alton and a number of other roads regarding wages. They are that wages will be left to the Labor Board. There can be no strike on these roads. There will be no general strike ballot issued covering all of the remaining roads. Instead, the general committee of each road will ballot its road and the vote will be taken whether or not to strike on that particular road."

Such an attitude on the part of this organization, if consistently maintained, would greatly weaken the threatened strike of the employees covered by the Board's recent decisions.

The second development of this character came in the form of a compilation of statements made by the leaders of the four train service brotherhoods each of whom declined to attend the meeting of rail and mine union chiefs at Cincinnati, Ohio, on June 20, to consider a "coalition" in line with the agreement adopted several months ago.

Another development of a similar nature comes in reports from Washington as to the government's attitude toward the threatened strike and which is covered more fully elsewhere in this issue.

B. M. Jewell, president of the railway employees' department of the American Federation of Labor, in a statement issued on June 17, charged that the Labor Board had assisted the railroads of the country in perfecting an anti-strike machine and that its recent decisions were "cleverly handed down to create a split between the employees essential to the daily operation of the railroads and the workers in less essential branches of railroad service.

"This was made plain through the fact that the decisions of the Board did not cut the pay of telegraphers, train dispatchers, signal foremen and foremen in some of the shop crafts," Mr. Jewell continued. "Not any of the employees required in the running of trains received a wage cut. The train service unions have not received a cut and cannot receive one before next fall if at all. Train dispatchers and telegraphers are needed for the running of trains. Certain classifications of clerks also escaped cuts. These clerks are needed in the running of trains.

"This makes it possible for the railroads to build an anti-strike machine to fight the unions, which are now balloting on the question of calling a strike. The railroads will be able to run their trains if a strike should be called by bringing about this split between the unions. The men who have received no wage cut cannot go out on a wage strike because they have no reason.

"The Board has arranged to take a vacation July 1, and will not be in a position to stop this fight as it did the strike threatened by the train service men last fall.

"More than anything else, the railroad men affected by wage cuts object to the line of reasoning advanced by the Board that the wage reductions were made necessary because the railroads cannot pay any more. Somebody is trying to force a walk out."

Mr. Jewell said he did not believe any power could intervene to stop the strike if it should be called because the unions have complied with all provisions of the law.

The situation pointed out by Mr. Jewell is acting as a damper on the enthusiasm of the men for a strike. However, the reasons given by Mr. Jewell for this situation, are obviously untrue and unfounded.

Labor Leaders Send Ultimatum to Labor Board

On April 18, the labor leaders attempted to justify their threatened strike in a letter addressed to the Labor Board. This letter charges that the Board has failed to meet the requirements of the Transportation Act, that it has invariably opposed labor in its decisions and that it has put railway employees on less than a "living wage."

After following very closely the arguments made in the dissenting opinion, quoted in part above, this ultimatum says:

"As the matter now stands there is no provision in the law providing for an appeal of any kind against a decision of your body however mistaken or unfair it may be. When, therefore, there occurs a miscarriage of justice of such colossal and permanent injury to railway labor as your decisions will bring about, the only means of remedy which the injured parties have is to reject your decisions.

"This procedure is perfectly legal. While it should only be used as a last resort our membership may decide it to be fully justified by your denial of elementary and long estab-

lished rights and by the seriousness of the situation which you have created.

"Your decisions have been submitted to a strike vote of our members and we are awaiting the result of their action. Should our members decide not to accept your decision, or in other words to strike, we shall sanction their action and advise you accordingly.

"We have therefore exhausted every possible way to secure a remedy for the unjust conditions which have resulted from the refusal of the railroads to comply to the law and from the failure of the Labor Board to safeguard and guarantee our rights under the law."

B. W. Hooper Predicts Peaceful Settlement of Strike Crisis

Simultaneously with this ultimatum B. W. Hooper, chairman of the Board, issued a statement declaring that he was confident the present strike crisis could be bridged without a strike. He said in part:

The present situation is hopeful. There is no occasion for impatience upon the part of anybody. Neither rates nor wages are permanent, because the conditions upon which they are based are not permanent. I believe that the situation will be gradually cleared up, and that there is good reason to also believe that the railroads will remove one impediment to good feeling on the part of their employees by discontinuing the contract system regardless of their convictions as to its legality. This will go a long way toward the restoration of cordial relations.

Only Saturday the Board received a communication from the Southern Pacific giving notice that the labor contracts complained of by its employees had been done away with, and that the road had no intention to again resorting to the farming out of its labor. There are reasons to believe that this example will be speedily followed by other railroads. It is the unanimous judgment of the Wage Board that it should be. If the men are expected to respect the decisions of the Board, the managements must do the same thing. A fair-minded public will not stand for anything else.

Labor Board Replies to Labor Leaders' Ultimatum

Chairman Hooper of the Board, on June 20 replied to the ultimatum of the labor leaders, abstracted above, in part as follows:

It is to be presumed that you do not desire that the members of your organizations shall vote for a proposition that contains such possibilities of loss and detriment to themselves, upon a misunderstanding of the action and attitude of this Board. It is a fact, however, that your letter does manifest a strikingly distorted conception of what the Board has done and why it did it.

Let me call attention to a few statements in your letter.

1. Your statement that the Board's last decision "states openly that pressure of circumstances was such that the Board was unable to determine just and reasonable wages" is not correct. The decision contains no such statement and none that can be fairly so construed.

The decision recites at length the abnormal economic and industrial conditions of the post-war period, and then says:

Surrounded by such abnormal conditions, the Labor Board has not been permitted to deal with the question of what constitutes just and reasonable wages and working conditions in *the same undisturbed and uncomplicated manner as would have been possible in normal times.*

This simple recognition of difficulties experienced by the whole world should not be twisted into an interpretation designed to mislead the men whose interests are most directly involved.

2. Your statement that this Board says that "the establishment of just wages for railway workers must await the complete satisfaction of ownership in the matter of rehabilitation and profits" is an inexcusable perversion of both the language and meaning of what the Board in fact said. A strike of railway employees, involving their wages, their employment and their welfare, based upon such misleading statements of this Board's sentiments and declarations would be unjust to the men and to the public.

3. The statement in the Board's decision "that labor can not be completely freed from the economic laws which likewise affect the earnings of capital" is so obviously sound that it will not be questioned any where this side of the kingdom of the Bolsheviki. And yet, you mention this as an occasion of offence.

Your construction of this as meaning "the treatment of labor as a commodity" is strained, especially so, in view of the fact that the Board, in the same paragraph, said:

It should be said that the Labor Board has never adopted the theory that human labor is a commodity, to be bought and sold upon the market, and, consequently to be reduced to starvation wages during periods of depression and unemployment.

4. Your statement that the Board "failed to take into consideration the principle that even the lowest paid railway employees, such as section men and laborers, should receive at least a living wage," is utterly baseless.

Your continual isolation and accentuation of the fact that a minimum rate of 23 cents an hour, $1.84 a day, was established for section men, is entirely misleading, because it overlooks or suppresses so many connected facts, among which are the following:

1. The rate for section men ranges from 23 to 35 cents per hour.

2. A comparatively small number of them receive 23 cents per hour. A vast majority of them receive the higher rates. This is shown by the fact that the average rate per hour is 32.7 cents.

3. The 23 cent rate is found on a comparatively small number of divisions on a few roads in the South and Southwest. It is not even found on the Southern and Illinois Central which cut completely through the South.

4. Where this minimum rate is found, the cost of living is usually low, and the men, in many instances, are furnished free living quarters.

5. In 1915, this class of labor received an average hourly rate of 15 cents, and in 1917, an average hourly rate of 19.3 cents.

6. The hourly rate of this class of employees has therefore increased under the present decision, 69.4 per cent over 1917, and 118 per cent over 1915.

7. Based upon the cost of living, the purchasing power of the hourly wage of section men under the present decision is 44.5 per cent greater than it was in 1917, and 37.3 per cent over 1915.

8. If it be said that the 10 hour day prevailed in 1915, and the 8 hour day now, it may likewise be said that the man either gets the benefit of the extra two hours for his own purposes or, in many instances, he will now be permitted to work the two hours, since punitive overtime has been abolished for this class of employees for the ninth and tenth hour.

9. Even comparing the present 8 hour wage with the 10 hour wage of 1915, the purchasing power of the new wage is 9.8 per cent greater than that of 1915, and the man has, on top of this, the gift of two hours' time for other activities.

10. It must also be clearly understood that the 23 cent rate will exist only in a territory where the Railroad Administration after careful investigation, found a justification for and did establish a lesser rate than paid the same classes in the balance of the country, which condition has not been disturbed by decision of this Board.

In view of these facts, not one of which you can yourself dispute, there is no ground for the fierce assaults which you make upon the action of the Board in this matter.

For your information, I will say that I recently made some limited investigation, personally and on the ground, of the wages of common labor in one Southern state, and I found the new rate for section men appreciably higher than the rates being paid to similar labor in other employments.

It may also be noted just here that the average pay of section foremen under the new decision is 119.7 per cent higher than it was in 1915, and that the purchasing power of the section foreman's wage is 38.3 per cent greater than it was in 1915. His average hourly rate in 1915 was 23.3 cents, and, under the new decision it is 51.2 cents.

You do not enter into any discussion of the wages fixed by the Board for other classes of employees, but I reiterate here the statement demonstrated in the decisions of the Board that the purchasing power of these rates is very considerably larger than it was in 1917, just before Federal control, or than it was in the year you prefer to use as a base, 1915.

Surely the leaders of these railway labor organizations can not expect to win the approval of the people of the United States by a rigid, unyielding resistance to the inevitable process of re-adjustment which has been in progress for the past year. If the public is satisfied that the railway employees have been even more than fairly dealt with, by comparison with similar labor and in view of the conditions surrounding their work, there will be no demand that they shall be treated as absolutely immune from the operation of the economic processes through which everybody else must pass.

The fact can not be overlooked that the policy of the leaders of the employees seems to be to accept no reduction, however slight. For example, a strike vote is being submitted to the stationary engineers, firemen and oilers, whose wage under the new decision show an enormous increase over the compensation they received before the war. Notwithstanding the increased cost of living, the increase in the pay of these employees has been so great as to result in the following percentage of increase in the purchasing power of their wages under the present decision over 1915:

Stationary engineers	70%
Stationary firemen	42.1%
Engineroom oilers	42.1%
Boiler room water tenders	25%
And coal passers, boiler room	25.9%

The increase of their actual daily wage under the new decision

over 1915 ranges from 100 per cent to 169.9 per cent. And yet there is submitted to them a strike ballot.

It is scarcely worth while to multiply these examples of the real meaning and effect of the Board's decisions of which you complain.

Let me say, before concluding, that the members of your organization have no occasion to reflect upon their official representatives in connection with the conduct of those wage disputes before our Board. The employees have been ably and loyally represented, and, in my humble judgment, have secured results that should be satisfactory to them. With the degree of friendly interest that I feel in these organizations and with the recognition that I accord to their great service to their membership, I am hopeful that they will not adopt a course that will surely prove disastrous to the organizations and unfortunate to the men composing them. It is regrettable that such a step is contemplated at a time when the country is just entering upon an era of more stable industrial conditions, that gives promise of an enlarged degree of prosperity to railway employees.

Loree Denies Lauck Charges

WASHINGTON, D. C.

TESTIFYING BEFORE THE Senate Interstate Commerce Committee on July 19, in connection with the railroad inquiry, L. F. Loree, president of the Delaware & Hudson, denied charges made before that committee by W. Jett Lauck, representing the railway unions, that there is an interlocking combination that controls the management, financing and operation of the principal railroads of the United States.

"In general," said Mr. Loree, "Mr. Lauck's testimony appears to me to be misleading, to contain many errors of fact and erroneous deductions, to be self-contradictory at many points and abundantly to contain intrinsic evidence that it is not worthy to be considered as a serious contribution to the elucidation of any railway problem."

Mr. Loree referred specifically to an exhibit filed by Mr. Lauck containing a list of 25 men, one of whom was Mr. Loree, who are alleged to link together 99 Class I railroads operating 211,280 miles, or 82 per cent of the country's steam transportation systems. The men designated in the list, Mr. Lauck testified, are, or have been, directors in the railroad corporations named in the exhibit.

"I most emphatically deny that I am a party, or ever have been a party, to any combination or understanding of any sort, express or implied, which tends or is intended to secure uniformity or concert in managing, financing or operating the railways of the United States or any group of such railways, unless the word 'group' is understood to mean a number of interrelated corporations, constituting one of the many separate and independent railway systems which are now frankly and openly under the control of a single interest. I am not, and never have been, the agent or representative of any such combination or understanding. I do not know of the existence of any such combination or understanding, now or in the past, and I believe that nothing of the kind exists or ever has existed in these United States. If this denial is not as comprehensive and categorical as it can be made, I should like to have the language necessary to perfect it brought to my attention, for it is my purpose, once and for all, to deny every statement, implication, suggestion and innuendo contained in the exhibit referred to and in the accompanying testimony or statement, except that the persons therein named are or have been officially connected with certain separate and independent railways or systems of railways.

"Considering the list of 25 men, I find that they are not men with joint or even common interests or financial or political or social affiliations. Intrinsically considered, to those who know anything of their activities, it is absurd to suggest that the men in this list are bound together for any purpose whatever, or that their endeavors are united in any common purpose or project. They are all men who have attained positions of responsibility in their vocations and who possess the confidence, each of them, separately and in his own rights, and by title of experience and things accomplished, of greater or smaller bodies of free Americans who are railroad stockholders."

Mr. Loree called attention to the fact that, under the transportation act, every individual who is willing to hold more than one position as either an officer or director of a railroad must first obtain the express sanction of the Interstate Commerce Commission, while the Clayton act also imposes further restrictions upon such railroad officials.

"I call attention to this merely to show that if the exhibit filed by Mr. Lauck represents the facts of today and if those facts are in any way subject to criticism, the situation is fully within the control of public authorities and no one can doubt that the constituted authority desires fully to meet its obligations," said Mr. Loree.

The witness said that the list of railroads contained in the exhibits is "misleading and made up in such a way as to lend itself to the illusory and false suggestion apparently to be conveyed." As an example, he called attention to the names appearing in the list of the Southern Railway, the Alabama Great Northern; Cincinnati, New Orleans & Texas Pacific; Mobile & Ohio; Georgia, Southern & Florida, and the New Orleans & Northeastern Railroad; all, he said, make up the Southern Railway's system, but the names are so widely scattered that their identity as a part of that system is obscured.

Only 52 Systems, Not 99

This is also true, Mr. Loree said, of many others in the list, with the result that instead of there being 99 separate railways, there are only 52 actual systems represented in the exhibit.

Regarding the charge made by Mr. Lauck that because of "banker-management," the railroads have issued securities with par values in excess of the moneys realized and sold them for more than par, but for smaller premiums than might have been obtained, Mr. Loree said:

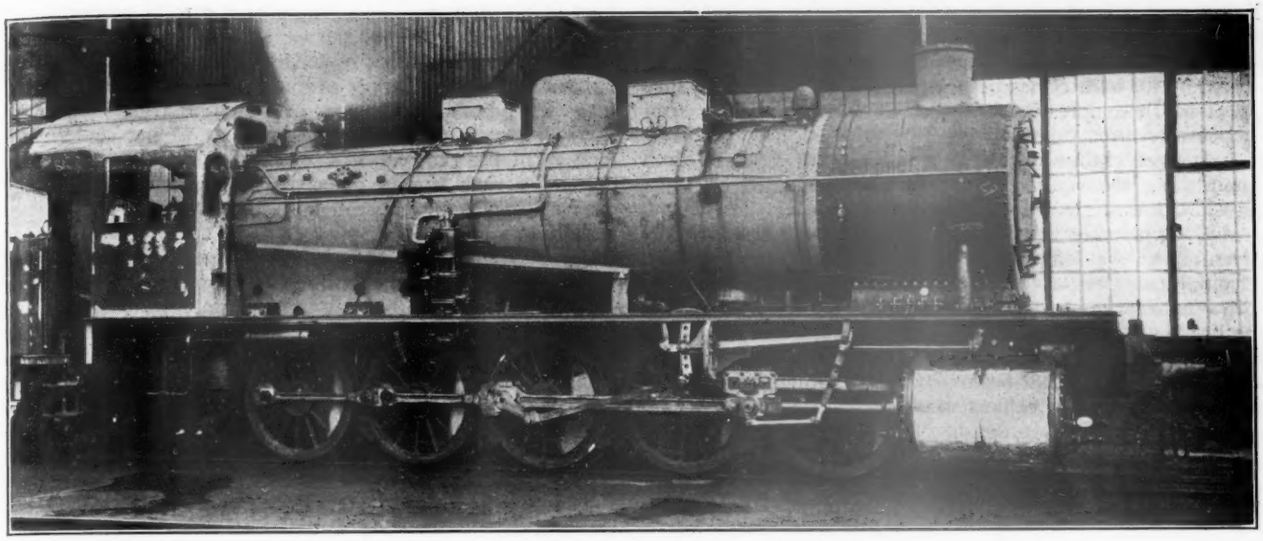
"There is no basis for the charge that securities are improvidently issued or that less is realized from their sale than should be realized. But if the charge is insisted upon, it may well be that the defense should be left to the public authorities who possess the power to regulate these matters. If the charge is warranted, these authorities are, in this respect inadequate for their duties or derelict in their performance. I do not concede they are vulnerable to either complaint."

Mr. Loree told the committee that the savings to be effected, as alleged by Mr. Lauck, from the installation of super-heaters and similar improvements on locomotives are very much overstated.

"In the hands of a careless engineman, the super-heater is little more than a supplementary and relatively inefficient boiler," said Mr. Loree. "To say the least, we must look to discipline and supervision quite as much as to the appliance itself for economic results."

"The sinister suggestions in regard to prices for equipment and other supplies, made by the witness, are without specifications or evidence," said Mr. Loree, referring to charges made by Mr. Lauck that the roads have paid excessive prices for supplies and equipment. "They consist of bald acquisitions or more cautious implications, and might very properly be dismissed without other response than a demand for evidence—names, places and dates.

"If anyone has been guilty as charged, he has violated his obligations to the owners of the property and can be compelled to make restitution. If such scandalous conduct is known to the person who made the charge, it is his duty to present the facts in such a way that proper action can be taken; if he does not know of such conduct, he should withdraw his charges."



Unaflow Freight Locomotive Built by A. Borsig, of Berlin, for the German State Railways

Recent Developments in the Unaflow Locomotive

Exhaust Ejector Effect Overcomes Handicap of High Compression and Reduces Size of Cylinders

THE RECIPROCATING steam engine has been freely criticized as an inefficient machine. During recent years turbines and internal combustion engines have displaced steam engines for many purposes, principally where economy of fuel is an important factor. In spite of the trend toward other types of prime movers, the reciprocating engine, with certain improvements, has retained its place in locomotive service due to the advantages of simplicity, reliability and large power output in relation to its size and weight. The steam engine has not been neglected by scientists and engineers and constant progress is still being made which will probably result in that type of engine holding its place for many years to come.

Characteristics of the Unaflow Engine

One of the recent developments in reciprocating steam engines which promises to add to the efficiency of the locomotive is the Stumpf unaflow cylinder arrangement. Briefly,

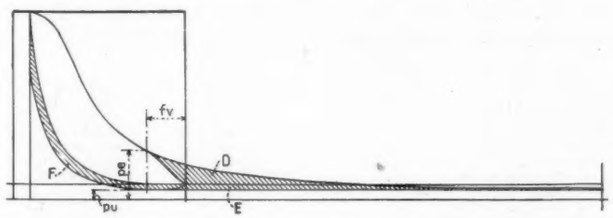


Fig. 1—Effect of Exhaust Ejector Action on Indicator Card

the unaflow engine consists of a piston of a length somewhat less than the stroke of the engine working in a cylinder of nearly twice the usual length. At the center of the cylinder is a row of exhaust ports which are uncovered by the piston at each end of the stroke. The admission of steam takes place as usual through valves and ports at the end of the cylinder. Thus the steam flows through each end of the cylinder in one direction only, which results in a considerable reduction in the losses due to heat transfer between the steam and cylinder walls and a considerable economy in the use of steam.

Professor Stumpf, inventor of the Stumpf unaflow engine, has recently given attention to the design of locomotives and about 200 locomotives of this type are now operating in Europe. The Stumpf Unaflow Engine Company, Syracuse, N. Y., is now arranging for installations in this country.

The unaflow cylinder as ordinarily designed is best adapted to condensing engines. Compression occurs early in the stroke and the large amount of negative work is a disadvantage in getting the high mean effective pressure desired in locomotive service. This difficulty can be overcome by supplementary exhaust valves with some sacrifice of economy. Very short cut-off is desirable in a unaflow engine and this involves a large cylinder if the engine is to deliver an average piston thrust equivalent to that of the counterflow engine with its longer cut-off. The unusual length of the cylinder also complicates its application to the locomotive.

From the features already mentioned it is apparent that the design of the unaflow locomotive presents numerous difficulties but experience with locomotives of this type now in service indicates that the handicaps have been overcome and the unaflow now offers an opportunity for eliminating some of the losses which are common to the operation of other types of reciprocating engines.

The Exhaust Ejector Principle

One of the most important improvements in the latest design of unaflow locomotives lies in the application of the exhaust ejector principle. The method by which this is utilized to overcome the difficulties met in the design of the unaflow locomotive is illustrated in Fig. 1. A loss of area in the indicator diagram begins within the limits of the piston stroke due to the fact that the exhaust commences with a certain exhaust lead before the dead center is reached as shown at *fv* in Fig. 1, this loss increasing as the exhaust lead and terminal expansion pressure *pe* increase. For small exhaust lead and low terminal pressure, this loss is neg-

ligible and it is almost always insignificant when compared with the loss represented by the toe of the diagram, shown shaded at *D*. In the unaflow locomotive the energy represented by the area *D* has been utilized to reduce the pressure *pu* at which compression begins, with a consequent lowering of pressure throughout compression.

A smaller clearance volume may therefore be used thus diminishing the volume loss. The area regained on compression, shown shaded at *F*, is proportional to the shaded area *D*, or in other words, the higher the terminal expansion pressure, or the longer the cut-off, the lower will be the terminal compression pressure. This makes the use of a longer exhaust lead *fv* permissible since the loss area within the limits of the piston stroke now form a part of the toe of the diagram and cooperates in lowering the back pressure at the time compression begins. There is, therefore, no objection to making the exhaust lead large since by increasing

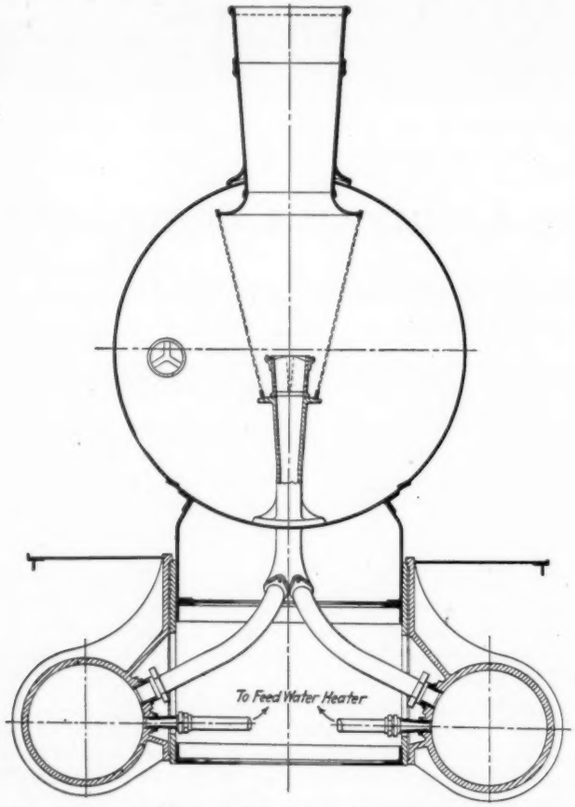


Fig. 2—Arrangement of Exhaust Passages and Nozzle

the duration of the exhaust the compression is shortened and the exhaust puffs are softened. If this is done the number of the exhaust ports at the center of the cylinder will be so far reduced that the exhaust belt ordinarily used in unaflow cylinders may be dispensed with and only one port remains which connects directly to the exhaust pipe. This also enables the piston and cylinder to be made considerably shorter.

The utilization of the energy represented in the toe of the diagram is based upon its conversion into kinetic energy by means of conical nozzles such as are commonly used in steam turbines. The general arrangement of the nozzles and passages is shown in Fig. 2. An engine having two cranks at right angles with an exhaust lead of 25 per cent will produce sufficient overlap of the exhaust period so that the exhaust of one cylinder begins before the other has ceased. If now the exhaust pipes are joined at acute angles, a jet ejector action is obtained. In order to obtain as high efficiency of ejector action as is practicable, friction losses must be kept at a minimum. This necessitates careful proportioning of the exhaust passages, the exhaust nozzle and the stack.

A theoretical analysis of the ejector action indicates that 28 per cent of the energy ordinarily lost may be converted into useful work. The steam consumption also is improved, the saving varying from 12 per cent at 43 per cent cut-off to 0 at 14 per cent cut-off. The exhaust ejector effect also permits a considerable reduction of clearance volume, the decrease in a typical case being from 17 per cent to 11 per cent.

The reduction in back pressure obtained in actual service by the exhaust ejector action is clearly shown by the indicator cards in Fig. 3 and the diagram in Fig. 4 which shows the variation in the pressure in the exhaust pipe between the cylinder and junction during a complete revolution of the crank. It will be noted that the cylinder card shows the exhaust coinciding with the atmospheric line for a considerable distance and the card taken from the exhaust pipe shows that a vacuum as high as 7 lb. per sq. in. was formed at certain positions.

The extent to which the increase of the exhaust lead shortens the cylinder and piston is clearly shown in Fig. 5.

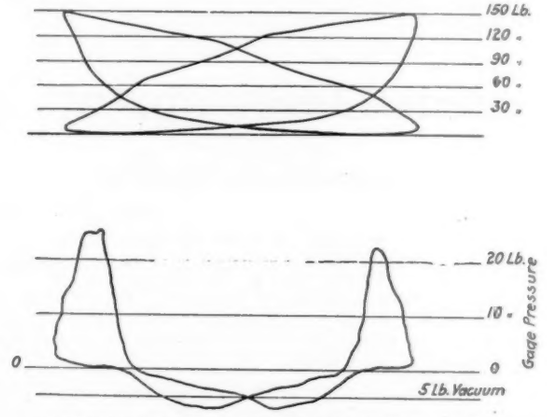


Fig. 3—Indicator Cards from Two Cylinder Unaflow Locomotive; Upper Card from Cylinder, Lower Card from Exhaust Pipe Between Cylinder and Junction. Cut Off 55 Percent, Speed 14 M.p.h. Steam Pressure 170 Lb. per Sq. In.

The long exhaust lead shortens the compression from 90 per cent to 70 per cent and reduces the clearance volume from 16.2 per cent to 13.6 per cent.

A German Unaflow Locomotive

The first locomotive in which the exhaust ejector principle was applied was a superheater freight locomotive of the German State Railways, built in 1920 by A. Borsig of Berlin, and illustrated at the beginning of this article. The main dimensions of the locomotive are as follows:

Cylinder bore	630 mm.	(24.8 in.)
Stroke	660 mm.	(26.0 in.)
Driving wheel diameter	1,400 mm.	(55.1 in.)
Maximum speed	60 km. per hour	(37.2 m.p.h.)
Steam pressure	12 at. gage	(177 lb. per sq. in.)
Grate area	2.62 sq. m.	(28.2 sq. ft.)
Boiler heating surface	149.65 sq. m.	(1,610 sq. ft.)
Superheater heating surface	53.00 sq. m.	(571 sq. ft.)
Total heating surface	202.65 sq. m.	(2,181 sq. ft.)
Feedwater heater surface	15.0 sq. m.	(162 sq. ft.)
Weight empty	65.5 tons	(144,200 lb.)
Service weight	72.0 tons	(158,700 lb.)

The cylinder of this locomotive is illustrated in Fig. 6. It is notable for its compactness, lightness and simplicity. This is in part due to the use of horizontal single-beat poppet valves which were employed for the first time on this locomotive. Piston valves have been used on some unaflow locomotives while others have double-beat poppet valves. The single-beat type of valve, although simple and perfectly steam tight, has so far not been favorably received because it requires a high lift and a large force to raise it. With the

high compression of the unaflow engine, however, the pressure on the valve is balanced to a large extent and the high lift is obtained by arranging the cam roller between the valve and the fulcrum of the valve lever as shown in Fig. 7. The lift of the cam, which is 14 mm. (0.55 in.) radially, is thus increased to 24 mm. (0.95 in.) at the valve. For cut-offs up to 50 per cent, the effective inlet areas of the single-beat valve are equivalent to the areas of a standard piston valve of 220 mm. (8.67 in.) diameter. The fact that beyond this cut-off the valve area remains constant must be considered a further advantage. The small cam lift permits of a cam profile of very gentle curvature, thus insuring smooth lifting and seating of the valve. The whole cam mechanism is very substantially constructed and swinging

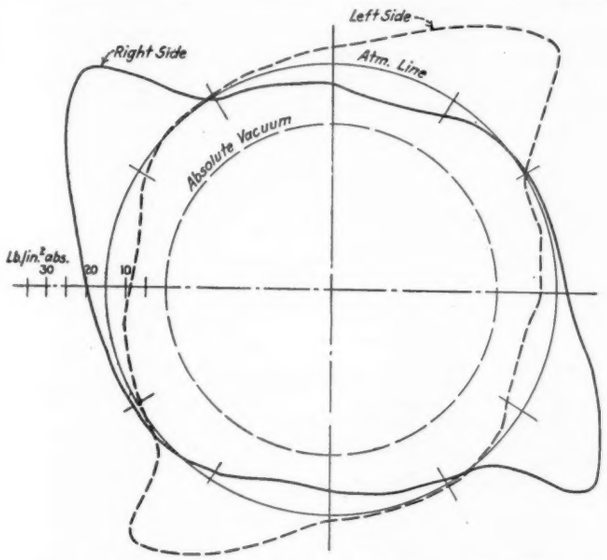


Fig. 4—Diagram Showing Pressure in Exhaust Pipe Throughout a Complete Revolution

levers were used instead of sliding parts wherever possible. It should therefore stand up well in service.

Details of Poppet Valves

The single beat valve is made of chrome-nickel steel and works on a removable steel seat expanded into the cylinder casting. If this seat should become damaged by scale or other foreign matter it can be easily resurfaced or renewed.

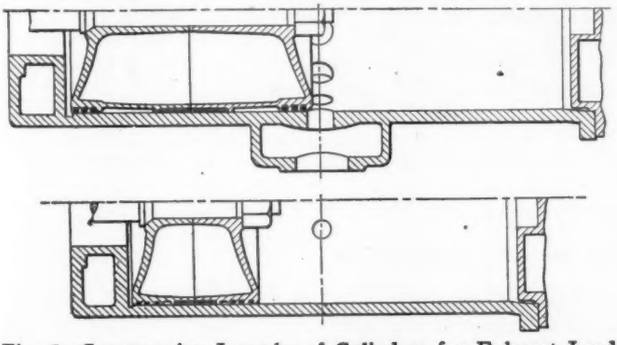


Fig. 5—Comparative Lengths of Cylinders for Exhaust Lead of 10 Percent and 30 Percent

The valve stem has a diameter of 25 mm. (0.99 in.) and is supplied with oil under pressure. The common center of gravity of the valve head and spring retainer is located at about the center of the guide so that good working conditions are assured. The valve stem, furthermore, is not exposed to the live steam, but to the varying pressure and temperature of the cylinder steam. It is entirely independent of the cam mechanism except for the tappet contact, and is free to follow any slight distortion of the cylinder casting.

When coasting, the valves may be lifted off their seats by compressed air admitted between small pistons formed on the valve tappets so that the rollers clear the cam. Special means for connecting the cylinder ends are therefore not required, and the relief valves ordinarily used to prevent high compression may be omitted, since the inlet valves act as such. They also relieve the high compression which may occur when the throttle is nearly closed. The automatic compression release device also may become superfluous since the late cut-offs at starting produce a strong exhaust ejector effect and the compression is therefore considerably shortened.

Attention may be drawn to the accessibility of the valves; for their renewal it is only necessary to take off the valve chest cover and disconnect the valve spring, the spring cap lock being a split spherical washer. Comparing this with the procedure of taking out an ordinary piston valve, the great simplification due to the single beat valve will be appreciated.

The driving parts and the Walschaert gear are the same as those used on counterflow locomotives. On account of its greater length the cylinder was moved forward 180 mm. (17.1 in.). The unaflow cylinder is not heavier than the corresponding counterflow cylinder, since the piston valve chest with its large exhaust chamber as well as the tail rod and its guide are omitted. This allows the piston rod of 95 mm. (3.74 in.) diameter to be bored out to a diameter of 60 mm. (2.36 in.), thus also saving weight. The forged steel piston heads, which are only slightly dished, hold between them a cast iron supporting drum cast from a special

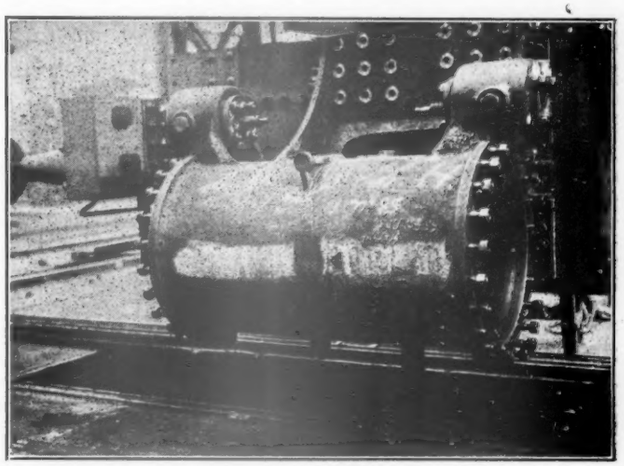


Fig. 6—The Unaflow Cylinder with Poppet Valves Is Light and Simple

soft mixture, while the cylinder is made of a hard quality of cast iron. The supporting drum is turned smaller than the cylinder bore by 2.2 mm. (0.087 in.) on a length of 140 mm. (5.5 in.) at its middle, which allowance increases to 5 mm. (0.197 in.) towards the ends. Each piston head carries three rings. The greater part of the total clearance volume of 12 per cent is taken up by a linear clearance of 40 mm. (1.57 in.) between the piston and cylinder head, and this also results in very small harmful surfaces. The pressure oil feeds are arranged at the middle of the cylinder, where the temperature is lowest and little possibility of carbonizing exists. One feed is placed on top and one on each side of 45 deg. below the horizontal center line.

Steam Consumption of Unaflow Locomotive

It is hoped that tests of these locomotives will soon be available and it is expected that they will show unusually high economy in the use of steam. The result of tests of

earlier type unaflow locomotives are available and justify the following conclusions: The unaflow locomotive shows better economy than the compound for small loads, while at higher loads its fuel consumption is higher than that of the latter. This can be easily explained by the effect of the long constant compression and the large clearance volume. The unaflow locomotive working with saturated steam shows in general a higher economy than the compound except for long cut-offs. Larger cylinders would be of advantage in this case. The superheater unaflow locomotive is at least on a par with the superheater compound, although even here the former has a slightly higher fuel consumption for heavy loads. Larger cylinders are, of course, more feasible with the unaflow system than with the compound engine.

Future Locomotive Development

In concluding the discussion of the locomotive in his recent book on the unaflow engine, Professor Stumpf makes the following observations on the probable future trend of locomotive design: "With the customary design of firebox, steam pressures up to 16 at. (235 lb.) gage are possible, although the number and size of the stays becomes excessive. For still higher pressures a different design of firebox would be necessary, such as for instance a box of the Brotan type, which permits of steam pressures of 20 at. (294 lb.) gage. By raising the steam pressure from 12 at. to 20 at. gage (176 lb. to 294 lb.), the amount of heat which can be converted into work increases from 116 to 146 cal. per 1 kg. steam. This represents a gain of about 26 per cent.

"This remarkable result can only be attained by employing the unaflow principle, since the pressure at which the steam becomes saturated increases from 2.2 at. (32.4 lb.) to 4.75 at. (69.8 lb.) abs. and during a considerable part of the expansion moisture is therefore formed in the cylinder. This does not have much effect upon the economy of the unaflow engine, but is very detrimental to that of the counterflow cylinder where the moisture causes large surface losses.

"The practice with counterflow locomotives is therefore to use higher superheat with higher initial pressure. The increase in temperature, however, is the cause of many difficulties with piston valves and piston rod packings. Furthermore, the superheater elements must be shortened so that the flue gases do not exert a cooling effect upon the superheated steam. This in turn leads to a great number of superheater elements and inefficient utilization of space. The unaflow engine can of course be adapted to meet this condition in a better manner, since its design makes it more suitable for high temperatures than the customary counterflow cylinder with piston valves. On the other hand there is no necessity for using these high temperatures in the high pressure unaflow locomotive, since the unaflow action corrects the bad influence of moisture in the steam.

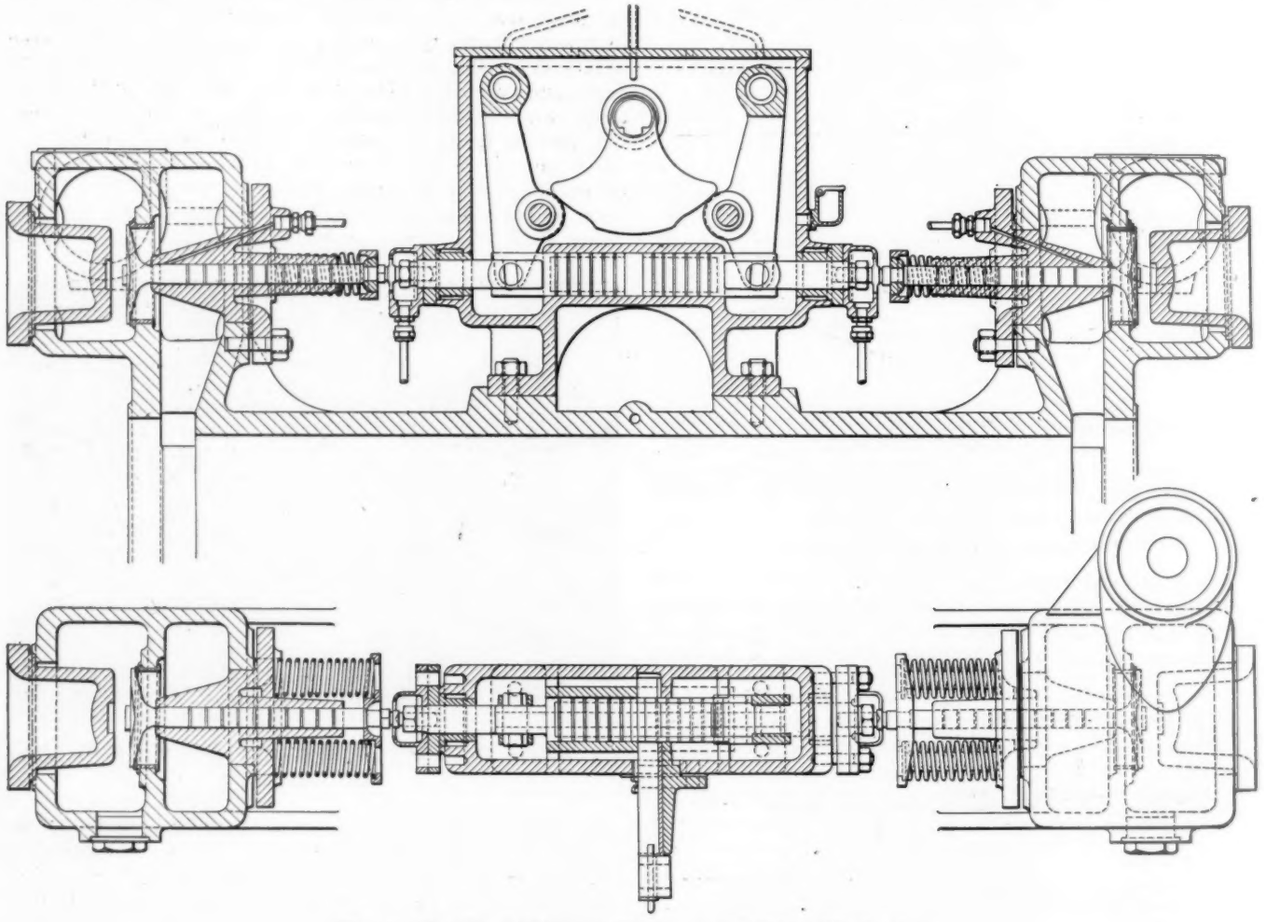


Fig. 7—Details of Poppet Valves and Lifting Mechanism

"The calculated gain of 26 per cent of the high pressure unaflow locomotive with exhaust ejector action will probably be exceeded in practice, since it does not include the benefit due to the single beat poppet valves, the reduction of the clearance volume to seven per cent, nor even the gain due to the unaflow principle itself.

"The future line of progress of the locomotive is therefore clear. It leads naturally from the two-cylinder to the three-cylinder engine with unaflow cylinders having small clearance volumes, to the use of single-beat poppet valves and the utilization of the ejector action of the exhaust, in combination with high pressures and modern superheat."

Hearing on Tentative Consolidation Plan

Railroads File Basic Information and Express Some Criticisms of Proposed Grouping

WASHINGTON, D. C.

THE HEARING on the Interstate Commerce Commission's tentative plan for the consolidation of the railroads into a limited number of systems, as it applies to the southeastern territory, was resumed before Commissioner Hall and Examiner Healy on June 15 after having been adjourned from April 24. It is to be followed by other hearings in various parts of the country. As a result of conferences between Commissioner Hall and a committee of railroad counsel appointed at the former hearing the roads were prepared with basic statistical data and information regarding the finances, traffic and operations of their properties which the commission desired as the foundation for its record and the work of preparing a complete consolidation plan, but there was evident some of the same reluctance on the part of many of the railroad officers who testified to make suggestions as to what roads they should be combined with, except as they had objections to offer to the grouping proposed in the tentative plan or as the tentative plan follows their present affiliations, as in the case of the Atlantic Coast line, Louisville & Nashville and Nashville, Chattanooga & St. Louis.

Illinois Central—Seaboard Air Line

SYSTEM NO. 12—ILLINOIS CENTRAL-SEABOARD

Illinois Central
Yazoo & Mississippi Valley
Central of Georgia
Seaboard Air Line
Lynchburg, Va., to Durham, N. C., branch of Norfolk & Western
Gulf & Ship Island
Tennessee Central
Carolina, Clinchfield & Ohio

NOTES—Prof. Ripley recommends that a separate system be built around the Seaboard Air Line.
The Gulf & Ship Island is not included in any system by Prof. Ripley.
The Carolina, Clinchfield & Ohio may be included in system No. 11, Atlantic Coast Line-Louisville & Nashville.

The first day of the hearing developed that the Illinois Central does not want to have the Seaboard Air Line combined with its system as proposed and the Seaboard also failed to see any advantage in the plan but expressed a preference to be let alone. C. H. Markham, president of the Illinois Central, was the first witness and began by filing and explaining to some extent 25 exhibits consisting of maps, charts and tables giving the basic information as to the plant and facilities of the Illinois Central and Central of Georgia, their traffic and interchange with other lines and their financial structure. Prof. W. Z. Ripley, of Harvard University, who prepared a report on which the commission's tentative plan was based, assisted the commissioner and examiner in bringing out facts for the record by questioning witnesses. He asked Mr. Markham whether the Illinois Central and the Frisco lines into Birmingham compete for Kansas City business. Mr. Markham replied that they do to some extent but he would rather not express an opinion as to whether the Frisco line should be given to the I. C.

After presenting the general data Mr. Markham took up a discussion of the tentative plan for System No. 12, taking into the Illinois Central, Yazoo & Mississippi Valley, Central of Georgia and Ocean Steamship Company of Savannah, Seaboard Air Line, the Lynchburg-Durham branch of the Norfolk & Western, the Carolina, Clinchfield & Ohio, the Gulf & Ship Island and the Tennessee Central. He said the Illinois Central does not favor the inclusion of the Seaboard Air Line and the Tennessee Central in its system and that it follows that it would exclude the Norfolk & Western branch and the C. C. & O. He then outlined the history of the development of the Illinois Central system, saying it is the only one of any size following the lines of longitude and broadly speaking the only north and south trunk line in the country. It serves the great central valley and it has prospered by rigidly confining its activities to its natural territory, thereby contributing to the development of the territory, and the lines it has taken on have added strength to the main lines. The Yazoo & Mississippi Valley, he said, is an integral part of the Illinois Central and itself owns practically no freight cars, using those of the Illinois Central. The officers above general superintendent have jurisdiction over both. The Illinois Central has aided the development of the Yazoo & Mississippi Valley and consequently of western Mississippi and that road constitutes a second main track of favorable grade for the Illinois Central through business south of Memphis, practically a water grade level, while the Illinois Central runs through the foothills.

A separation of these two lines would lower the standard of service and increase the cost of operation of both lines. The Yazoo & Mississippi Valley has been brought to its present strength by the Illinois Central and they are so closely knit together that their separation would be detrimental to the public interest. Referring to the Tennessee Central, Mr. Markham said that the only thing that the Illinois Central could do with it would be to use it for an entrance to Nashville and the Illinois Central now has all the benefits of such an entrance through divisional arrangements without the responsibility of ownership. It had once given some consideration to the Tennessee Central and had decided it would not take it as a gift.

Seabord Air Line Competitive with Central of Georgia

Referring to the proposed consolidation with the Seaboard Air Line, Mr. Markham said that the latter forms a north and south line along the Atlantic coast, while the Illinois Central is 700 miles away. There is absolutely no identity of interest or opportunity to form new traffic routes that would benefit the railroads or the public and there seems no way of bringing these two properties any closer together than is now afforded by the connection at Birmingham. The Seaboard is very highly competitive with the Central of Georgia, which reaches every important point in the state except in the extreme southeast. The Atlantic Coast Line and the Southern are traffic connections on eastern business. Therefore, the Seaboard Air Line would add practically nothing to the Illinois Central or the Central of Georgia nor would benefits accrue to the Seaboard by combination with the Illinois Central. Such a consolidation would have the effect of abolishing competition and would not be in harmony with the law. In response to questions by Prof. Ripley, Mr. Markham said the Illinois Central is not looking for more lines, but if the Gulf & Ship Island is to be placed somewhere, probably the Illinois Central is a logical place for it, but he could not conceive of any possible conditions under which the Illinois Central and the Seaboard could profitably be put together. The Mississippi Central and the Gulf, Mobile & Northern, he said, belong together and if one should go to the Illinois Central, the other ought to. Commissioner Hall expressed an appreciation of the very clear form in which the Illinois Central exhibits had been prepared and said they would be very helpful.

Carolina, Clinchfield & Ohio

J. J. Campion, vice-president of the Carolina, Clinchfield & Ohio, filed statements containing the basic information

for his road, but declined to discuss where the road should be put in any consolidation scheme. He said it occupies a unique position and might fit into a number of other systems, such as the proposed systems Nos. 10, 11 or 12, or one of the systems north of the Ohio river. Commissioner Hall pressed him for an expression of opinion as to what should be done, assuming that some plan has to be made and that unless it were placed in the same system, the road could not be consolidated at all, but Mr. Campion would give no expression. He said the road's heaviest interchange is with the Southern Railway.

Vice-President Capps of Seaboard Air Line Testifies

C. R. Capps, vice-president in charge of traffic of the Seaboard Air Line, filed basic statements and in addition discussed the traffic situation to show that a combination of the Seaboard and the Illinois Central would not be beneficial. It would shorten no through routes, he said, except the mileage between Chicago and Atlanta, and it would lengthen the mileage of several existing routes. The Illinois Central would not give the Seaboard any more northern connections and the connections from the Virginia cities north might or might not be friendly. The two roads have not found it necessary to establish through traffic arrangements and there is no connection with the Illinois Central except at Birmingham, where the interchange amounted to less than 37,000 tons in 1921. Mr. Capps said the Seaboard is generally the short line in its territory and is less dependent on any one article of traffic than other southern lines. The effect of his statement was that the road feels it is sufficient unto itself and should be left alone. In reply to questions, he said that if the Georgia Southern & Florida were placed in System No. 10, the Southern, and the Atlanta, Birmingham & Atlantic placed in System No. 11, the Atlantic Coast Line, the result would be to give those two systems each two routes between Atlanta and Jacksonville and the Seaboard no route. Prof. Ripley said that it had been proposed to give the Atlanta, Birmingham & Atlantic to the Atlantic Coast Line because its present route to Jacksonville is very indirect.

Norfolk & Western Does Not Want to Lose Branch

N. D. Maher, president of the Norfolk & Western, made a brief statement regarding the proposal to cut off its line from Lynchburg to Durham and place it in the Illinois Central-Seaboard system and also its line from Roanoke to Winston-Salem and the Winston-Salem Southbound to be placed in the Atlantic Coast Line system. He said this would disrupt the route from Hagerstown to Winston-Salem, which had proved very valuable during the period of congestion when the routes through Potomac Yard were crowded, and that the result would be to limit competition and change the channels of traffic in this territory.

The Durham line, he said, is of great future importance to the Norfolk & Western.

Mr. Maher also submitted general information covering the Norfolk & Western, although the system which the tentative plan proposed to build up around the Norfolk & Western is not included in the southeastern territory. Prof. Ripley asked if it is not the disposition of the Hampton Roads lines to hold western traffic as far east as possible before turning it south and whether it would not be better to turn this traffic south at an earlier point. Mr. Maher said that the plan would require the Norfolk & Southern to interchange with the Southern at Lynchburg.

G. F. Butler, general freight agent of the Norfolk & Western, supplementing Mr. Maher's testimony, said that the proposed plan would have just the opposite effect of that suggested by Prof. Ripley in some instances. He said the public interest would be affected by closing the route from Hagerstown to Winston-Salem.

Atlantic Coast Line—Louisville & Nashville

SYSTEM No. 11—ATLANTIC COAST LINE—LOUISVILLE & NASHVILLE

Atlantic Coast Line
Atlanta & West Point
Charleston & Western Carolina
Louisville & Nashville
Nashville, Chattanooga & St. Louis
Louisville, Henderson & St. Louis
Western Railway of Alabama
Richmond, Fredericksburg & Potomac
Norfolk Southern
Atlanta, Birmingham & Atlantic
Winston-Salem Southbound
Roanoke to Winston-Salem branch of Norfolk & Western
Florida East Coast
Carolina, Clinchfield & Ohio
Georgia & Florida
Gulf, Mobile & Northern
Mississippi Central

NOTES—Prof. Ripley recommends that the Richmond, Fredericksburg & Potomac and Florida East Coast retain their present status without inclusion in any system.

The Carolina, Clinchfield & Ohio may be included in system No. 12, Illinois Central-Seaboard. Prof. Ripley recommends inclusion in system No. 10, Southern.

The Gulf, Mobile & Northern and Mississippi Central are not specifically included in any system under Prof. Ripley's report.

George B. Elliott, vice-president and general counsel of the Atlantic Coast Line; W. L. Mapother, president of the Louisville & Nashville, and W. R. Cole, president of the Nashville, Chattanooga & St. Louis, expressed general approval of the plan which combined these roads in System No. 11, Atlantic Coast Line-Louisville & Nashville, including the Western Railway of Alabama; Richmond, Fredericksburg & Potomac; Norfolk Southern; Atlanta, Birmingham & Atlantic; Winston-Salem Southbound; Roanoke to Winston-Salem branch of the Norfolk & Western; Florida East Coast; Carolina, Clinchfield & Ohio; Georgia & Florida; Gulf, Mobile & Northern, and Mississippi Central. Mr. Elliott said that the attitude of the Atlantic Coast Line toward System No. 11 is that if these consolidations are going through and the proposed Systems Nos. 10 and 12 are to be made, the grouping for the Atlantic Coast Line is in the main satisfactory and what it would have suggested. He felt that the Richmond, Fredericksburg & Potomac should perhaps remain neutral, but if assigned to one system, it should properly go to the A. C. L. The A. C. L. would also be willing to accept the right to consolidate with the Norfolk Southern and it feels that the Carolina, Clinchfield & Ohio is properly allocated if given to the coast line. This would give access to coal over its own rails. Regarding the A. B. & A., he said that the Coast Line business to that section is largely over the Central of Georgia but if the Central of Georgia is to be linked up with the Seaboard Air Line, the A. B. & A. would aid the Coast Line in getting to Jacksonville. He also felt that the Florida East Coast is properly allocated to this system. This attitude, he said, is predicated on the possibility of making these consolidations on satisfactory terms. Probably, he said, the other roads and the public would demand that the Richmond, Fredericksburg & Potomac be kept open as a bridge line.

Mr. Cole said that if there is to be any consolidation, the Nashville, Chattanooga & St. Louis has been properly allocated in the plan. Prof. Ripley asked Mr. Mapother his opinion regarding the disposition of the A. B. & A., if the Seaboard Air Line and the Illinois Central remain separate. In that case "it ought to be scrapped," replied Mr. Mapother.

Do Not Need Independent Chicago Entrance

Prof. Ripley also brought out an expression from Mr. Mapother that the southeastern lines do not need an independent entrance to Chicago. A complete plan, he said, might wisely stop these lines with the Ohio river and he would have no objection to including the Chicago, Indianapolis & Louisville, now owned half by the Southern and half by the Louisville & Nashville, in the Baltimore & Ohio system, as proposed in the tentative plan.

George R. Loyall, president of the Norfolk Southern, expressed the opinion that the proposed consolidation of his

road with the Atlantic Coast Line would eliminate competition in a large part of the territory. He felt that the line has a function to perform and it is its desire to continue to develop along its own lines. Therefore, it would ask to be let alone for the present. Commissioner Hall asked whether he would propose that the Norfolk Southern be made a system by itself, to which Mr. Loyall replied only that he was not prepared to say where it properly belongs. He said perhaps it is more of a feeder to the Southern Railway than to any other system and its principal competitor is the Atlantic Coast Line.

Mr. Mapother took the stand again to discuss the Carolina, Clinchfield & Ohio, saying he thought its inclusion in System No. 11 is entirely proper and that it would prove highly desirable if the plan were carried out. It could be connected with the Louisville & Nashville by the construction of only 12 miles of new road and would afford an outlet to the Seaboard for coal from eastern Kentucky and a desirable route to the central west from Carolina territory. The management of the Louisville & Nashville has had such a plan in mind for several years.

Basic information for the Florida East Coast was submitted by W. G. Brown, roadway engineer, and T. W. Pomar, comptroller, but in response to requests for an expression regarding the allocation of this line, S. M. Loftin, general counsel, said that the road is now being operated by trustees under the will of the late H. M. Flagler, which expires next year, and the present trustees do not feel that they ought to express any opinion. The president and vice-president are among the trustees.

J. L. Edwards, assistant to the receiver of the Atlanta, Birmingham & Atlantic, submitted the general information for this road, and pointed out that the increase in population in this territory has been greater than that in the balance of the state. He said that under the Railroad Administration it was used in connection with the Louisville & Nashville and Nashville, Chattanooga & St. Louis as one of the routes for northbound fruits and vegetables.

H. H. Dean, general counsel of the Gainesville Midland, said that this road should be allocated to the Atlantic Coast Line or the Central of Georgia, but not to the Seaboard or the Southern. It connects with four systems which go into Georgia, but to link it with the Seaboard or Southern would eliminate competition.

Southern System

Data on behalf of the Southern Railway was submitted by L. E. Jeffries, vice-president and general counsel, and A. H. Plant, assistant to the president, but they declined to give any expression of opinion regarding the tentative plan. At the conclusion of their testimony, Frank Roberson, attorney general of Mississippi, asked Mr. Plant whether the commission should cut the Alabama & Vicksburg-Vicksburg, Shreveport & Pacific system at the Mississippi river. Mr. Plant said he had no opinion on this.

Mr. Roberson then introduced as a witness S. A. Witherspoon, special counsel for the state of Mississippi in the anti-trust suit against the Southern, who presented an alternative plan for a consolidation of the Seaboard Air Line, Nashville, Chattanooga & St. Louis, Mobile & Ohio, the Memphis-Birmingham division of the St. Louis-San Francisco, and the Chicago & Eastern Illinois or the Chicago, Burlington & Quincy, in order to afford a line to Chicago, as a competitor for the Illinois Central system. He also proposed to take away some of the east and west lines of the Southern system. He said that the Southern and the Illinois Central now have a monopoly in the state which it would be desirable to break up.

The basic information furnished by each road in response to a questionnaire sent out by the committee of counsel after conference with Commissioner Hall, calls for maps, a classification of the road and tracks, equipment and terminals, also detailed statements regarding the traffic, bases of fuel supply, results of operation, capital obligations, interest and other charges. At the request of Commissioner Hall there was added to this list maps and charts showing in detail inter-corporate relationships of the companies comprising the existing systems.

A. J. Maxwell and W. G. Womble of the North Carolina railroad commission and a number of shippers of that state objected to the proposed plan of cutting off the Lynchburg-Durham branch of the Norfolk & Western and placing it in the Illinois Central system. They also proposed that the Toledo & Ohio Central be added to the Norfolk & Western to give a line to the lakes. The hearing on the Southeastern district was concluded on June 20.

Annual Meeting of Signal Section at Spring Lake

THE SIGNAL SECTION of the American Railway Association held its annual meeting at Spring Lake, N. J., on June 14, 15 and 16; and a partial report of the doings of the meeting was given in last week's *Railway Age*, page 1479. The attendance, by the final day, rose to above 400.

The officers elected for the ensuing year were C. A. Christofferson (N. P.), chairman; B. T. Anderson (D. L. & W.), first vice-chairman; W. M. Vandersluis, engineering secretary, Illinois Central electrification committee, second vice-chairman. The secretary is H. S. Balliet, Grand Central Terminal, New York. Those elected to serve on the Committee of Direction for the three year term were A. H. Rudd (Pennsylvania), C. F. Stolz (C. C. C. & St. L.), C. H. Tillett (Grand Trunk), and F. B. Wiegand (N. Y. C.). T. S. Stevens (A. T. & S. F.), was elected to serve for two years. Those elected to the Committee on Nominations for next year were W. J. Eck (Southern), A. H. McKeen (U. P.), F. H. Buchanan (Pennsylvania), F. P. Patenall (B. & O.), and F. C. Stuart (E. J. & E.).

Economics of Railway Signaling

A special committee on this subject, B. T. Anderson, chairman, made a progress report on its assigned subject, the determination of the relative economic value of block signaling as a means of protecting and directing the movement of trains and for reducing the cost of train operation. The report gave an outline of the plan which the committee proposes to follow, which outline follows:

The purpose in making these studies is mainly to determine to what extent train operation can be improved by installing up-to-date systems of automatic block signals and interlocking on roads that are not now equipped with a block system and also on roads equipped with manual block.

The method to be followed in making a study is to prepare a statement comparing the results of train operation under the method in use with the results to be attained under the improved method.

Data sheets with explanatory notes for use in making this comparison accompany this report.

The following illustrates a typical case:

The road to be studied is assumed to be a single track division, 100 miles between terminals, operated under the manual block system; switches at passing sidings all hand operated. The block sections vary greatly in length as the block stations are located so that station agents also act as block signalmen. This arrangement of the block sections which is more or less typical of the manual block system is one of the causes of delay. Another cause of delay is the stops that trains must make entering and leaving passing sidings, over hand-operated switches.

The first step in the study is to tabulate one year's results under this method of operation. The figures to be entered on data sheet under present method. The next step is to prepare a plan for equipping this piece of road with an up-to-date system of

automatic block signals and interlocking. Block section lengths to be laid out for maximum operation, the important passing sidings to be equipped with interlocking with low voltage switch machines for the outlying switches. Where necessary, the passing sidings are to be re-arranged and re-located so as to avoid the delays due to badly arranged siding or sidings located without regard to the required time interval between them.

The test of the efficiency of the proposed plan will be the extent to which the plan will eliminate avoidable delays, and thereby increase the average speed of trains without increasing their maximum speed.

As the increase in average speed is the key to the situation, the improved facilities must be so planned that the avoidable delays of the present method of operation will be eliminated. When the average speed of freight trains under the proposed plan has been determined, it will then be possible to arrive at the figures for the proposed plan. If the average speed of freight trains under the proposed plan shows a marked increase over the present plan of operation, the improvement in train operation will, it is believed, be large enough to fully justify the cost of the improved facilities.

Care of Oil Lamps

Committee V—Maintenance Rules and Instructions, submitted a report covering rules for signal maintenance; examination papers on signal maintenance and rules for the care of switch and signal oil lamps. These were accepted for submission to letter ballot for inclusion in the Manual. The rules for the care of oil lamps follow:

1601. Cleanliness is of the most importance in the care of lamps.
1602. Lamp bodies must be kept clean and in repair; soot or dirt must be removed and all vents must be kept open so that draught will not be impaired.
1603. Lamp founts must be drained at least once a month to remove sediment or water.
1604. Oil drained from founts must be retained and may be used for cleaning purposes or for thinning black oil.
1605. Filler caps must be kept in place to prevent dirt from getting in the oil.
1606. Burners must be scraped, wiped clean and vents opened each time the lamps are filled. When fouled with oil, soot or incrustations, they may be dipped or boiled in a solution of lye, rinsed in clean water and thoroughly dried.
1607. Chimneys of long life burner lamps should be cleaned with dry waste or paper only. They should never be washed. Broken chimneys should be replaced promptly.
1608. Long time burner wicks should be renewed every sixty days, as they accumulate dirt and gum oil which prevents the oil from flowing freely through them. Wicks must be of such length that at least 1 in. rests on bottom of fount.
1609. Lenses must be kept clean and bright, and if any are found cracked or broken they must be replaced promptly.
1610. Illuminating oils specified by the Company must be used. No attempt must be made to improve the quality by adding other oils. If unsatisfactory, make prompt report to.....
1611. Under no circumstances shall any other than illuminating oil be placed in receptacles provided for that purpose. Receptacles must be kept clean, closed against the entrance of dirt and moisture, and, unless designed for outside use, kept under cover.
1612. A space of ¼ in. must be left unfilled in founts for expansion and ventilation.
1613. When filling lamps in rainy weather, care must be taken to keep water out of the oil and from the wicks.
1614. Lamps equipped with long time burners must be inspected semi-weekly, or as instructed by.....crust removed from wicks and flame properly adjusted.
1615. Lamps equipped with one day burners must be cleaned, filled and flame adjusted daily.
1616. When lamps are lighted, the flame should be turned up to about one-half the height required to give full light and be allowed to burn until all parts become thoroughly warm, after which the flame may be adjusted to the proper height.
1617. Lamps must be placed and brackets so adjusted as to insure proper alinement with respect to spectacle and track.
1618. Lamps should be replaced on the same brackets to assure that proper alinement is maintained.

Joint Occupancy of Buildings

Committee III—Power Interlocking, presented a report on the joint occupancy of buildings for telegraph, telephone and signal apparatus. A survey has disclosed that in many cases where telegraph or telephone and signal apparatus is to be housed in the same tower or building, adequate provision has not been made for equally efficient installation, layout and location of the different classes of apparatus. The committee recommended that before plans are made for any new structure or alteration to an existing structure, due notice be given to the respective officers having charge of the installation, operation and maintenance of the different classes of apparatus, they to furnish full information as to the requirements.

The completed plans showing the location of telegraph, telephone and signal apparatus, pipes, ducts, outlets, entrances, doors, windows, etc., shall be submitted to the respective officers having charge of the installation, operation and maintenance of telegraph, telephone and signal apparatus for their approval. The provisions of this paragraph shall also apply where standard plans are used. Where plans submitted are not satisfactory the proper officers should confer and reach an agreement, if practicable.

This report elicited considerable discussion and finally was referred back to the committee. This committee also presented a specification for electric wiring for interlocking plants and one for the construction of underground conduit systems.

Reports of Other Committees

Committee XII—Contracts, submitted as its report a table of interlocking units and values which was accepted for submission to letter ballot.

Committee XV—Valuation, submitted forms for reporting material used and labor performed in construction, for submission to letter ballot and inclusion in the Manual. These forms have been prepared to meet the requirements of Valuation Order No. 3 of the Interstate Commerce Commission and also to provide for the allocation of costs for statistical purposes. These were ordered to letter ballot. The committee also submitted a table of average service life in years of the important units of the different types of signal installations and a construction program for signaling.

Committee VI—Standard Designs, submitted drawings for one-inch signal pipe and coupling; grooved trunking; built-up trunking; switch point drilling; switch adjustment-insulated; and highway crossing gate lamp. This committee also made a report regarding the best types of electric lamp for signal work.

Committee XVIII—D.C. Track Circuits, submitted methods of making d.c. track circuit tests for rail and ballast resistance with a form for a record and a report on the minimum limiting resistance allowable in series with track batteries which were accepted for submission to letter ballot.

Committee X—Signaling Practice, reported recent improvements in light signals, particularly the change in form of those on the Pennsylvania from four lights in a row to three. The Hall color light signal was described.

Committee IV—D.C. Automatic Block Signaling, submitted a report on requisites for circuits which after considerable discussion and some alteration was ordered submitted to letter ballot for inclusion in the Manual.

Committee II—Mechanical Interlocking, presented a long report made up of a number of specifications and drawings. The report contained the following specifications: concrete trunking; capping and support; compensation of pipe line; mechanical interlocking and paint and painting. An index for mechanical interlocking specifications was also presented as were three drawings, pertaining to instructions for applying compensation; a compensation chart and a crank chart, respectively. After brief discussion this report was accepted to be sent to letter ballot.

Committee VIII—A.C. Automatic Block Signaling, presented lists of requisites for the impregnation of coils applicable for coils for a.c. and d.c. signal systems; impregnating compound treatment for non-oil-proof electrical windings; impregnating compound treatment for partially oil-proof electrical windings; impregnating compound treatment of oil-proof electrical windings; and varnish treatment of electrical windings. All were accepted to be sent to letter ballot.

Curtailment of Activities

It was announced at the close of the meeting that by order of the board of directors the practice of holding sectional (district) meetings of the Section would be at once discontinued.

Chesapeake & Ohio Not Hurt by Coal Strike

Coal in 1921 75 Per Cent of Total Tonnage. Year's Result is 6.68 Per Cent on Stock

NORMALLY about 70 per cent of the tonnage of the Chesapeake & Ohio is bituminous coal. In 1921, because the decline in coal traffic was not as great proportionately as the decline in traffic generally, the percentage of bituminous coal to the total tonnage was 75 per cent. It would appear, therefore, that one of the most interesting factors in connection with the Chesapeake & Ohio at the present time is the effect that the coal strike may be having upon the road's welfare. The Chesapeake & Ohio serves both union and non-union fields. The total result, therefore, has been that the decline in traffic from the cessation of mining in the union mines has been balanced by an increase in the production of the non-union mines. The road, therefore, has not been hurt particularly by the coal strike but it has not had the expansion in coal traffic such as its neighbor carrier, the Norfolk & Western, has had the good fortune to experience. Putting this in the form of figures we find that the road's traffic in recent months has been running considerably ahead of its traffic in the corresponding months of 1921. Of course, it must be borne in mind that the early part of last year was a rather barren period for the Chesapeake & Ohio. Its coal loadings in March, 1921, averaged only about 6,000 weekly. In April they had improved so that they averaged slightly over 8,000, and in May, slightly over 10,000. The effect of the coal strik was first shown this year by the increased loadings in March, when the mines were rushing production in anticipation of the strike; in March the coal loadings averaged about 11,000 weekly. After the beginning of the strike there was a decline in traffic so that the loadings averaged only about 8,000 to 9,000 weekly. Since that time, however, they have gradually begun to increase to the extent that during the week ending May 27, the figure was 12,271. This shows what has been noted above that the coal strike has not severely hurt the C. & O., and it is apparent from the figures given that it is gradually bettering its position as the strike proceeds.

Great Improvement Over Last Year

The condition of the Chesapeake & Ohio today is very much different from what it was a year ago. In May last year the directors felt that conditions were so poor and the outlook so uncertain that it was best to defer action on the two per cent semi-annual dividend payable in June. There has been much comment about this action. The fact was, nevertheless, that the road at the time was producing some very poor earning statements. In the first four months of 1921 it had a net after rentals of only $1,509,402. It improved its position materially in the later months of 1921 with the final result that for the year it earned a net on its stock of 6.68 per cent, but that this would be the case was not in evidence in May. To bring the thing up to date it should be noted that in the first four months of 1922 the road had a net after rentals of $5,618,682, or that its poorest month this year, namely January, was considerably better than its best month in the first third of 1921. In fact, in February, 1921, the road reported a deficit.

The Chesapeake & Ohio's corporate net income for 1921 totaled $4,192,601, or, as above noted, 6.68 per cent on its capital stock. This fact combined with what has been said about the 1922 earnings to date, would seem to indicate that the road has succeeded in overcoming the situation which confronted it in the early part of 1921, and this fact one would suggest to be the outstanding characteristic of the road's position at the present time. This, nevertheless, does not change the fact that conditions in the early part of 1921 were bad. The annual report gives considerable attention to this and to the reasons why the dividend was deferred in May. It gives the additional fact that during May, 1921, the company had on hand over $7,000,000 in unpaid vouchers past due for 60 days or more. The report says that under the circumstances the directors deemed it advisable to conserve the cash resources. Following a statement concerning the manner in which business picked up during the latter part of the year and concerning also the savings in operating expenses due to economies of one kind or another, it continues: "The directors of your company are keenly alive to the hardship to many of its stockholders resulting from any interruption in the regular payment of dividends, and the deferring of the dividend which would ordinarily have been paid in June was due only to their conviction that its payment at that time would have interfered with the ability of your company to meet promptly and adequately its obligations to its creditors and to the public. The period of deflation through which your company, in common with the industries of the country generally has been passing, has involved the necessity of substantial sacrifice by many, including the employees and the officers as well as the stockholders of your company."

The 1921 Results

The transportation operations of the Chesapeake & Ohio gave it in 1921 a net railway operating income, or net after rentals, of $13,660,926 as compared with $11,158,326 in 1920. In 1921 it had a decrease of freight revenues of 7 per cent, a decrease in total operating revenues of 7.2 per cent, and the expenses were decreased 14.3 per cent. The road operated at a ratio of 79.6 in 1921 as against 86.2 in 1920. The increase in net operating revenue (operating revenues less expenses) was 37.3 per cent.

The actual revenue tonnage carried in 1921 was 31,493,087 as compared with 40,838,116 in 1920, a decrease of 9,345,029 or 22.9 per cent. The bituminous coal tonnage in 1921 was 23,724,147 as compared with 28,625,615 tons in 1920, a decrease of 4,901,468, which, it will be noticed, was proportionately a much smaller decrease than was the case of the tonnage as a whole. The result was that bituminous coal tonnage which in 1920 made up 70.1 per cent of the total, in 1921 made up 75.33 per cent.

The operating revenues totaled in 1921 $83,687,958 as compared with $90,190,745 in 1920, a decrease of $6,502,787. It is interesting in this connection to note that the ton-mile revenue in 1921 was 0.737 cents, an increase of 19.3 per cent over 1920. This explains the proportionately smaller decrease in revenues than in tonnage. The operating expenses for the year totaled $66,603,077. This compared with $77,744,521 in 1920, the reduction being $11,141,444, or, as above noted, 14.3 per cent. The reduction in operating expenses included reductions of 5.3 per cent in maintenance of way, 18.5 per cent in maintenance of equipment, and 15.9 per cent in transportation.

Maintenance

Insofar as concerns the reduction in maintenance of way, it should be brought out that there were increases in the total charged to the primary accounts of ties, rails and other track material which partly compensated for the decreases in the other accounts. The Chesapeake & Ohio gives detailed information concerning the amount of material used in main-

tenance. It showed that in 1921 there were put in track for maintenance 1,085,047 ties as compared with 1,052,369 in 1920, an increase of 32,678. Not quite one-half of the new ties put in track were of white oak untreated, and most of the remainder were of mixed oak, creosoted. The rail used in renewals in 1921 totaled 33,725 tons as compared with 12,814 tons in 1920, an increase of 20,911 tons. The larger part of the rail laid in 1921 was of 100-lb. section, the total being 21,197 tons. There were, however, also 8,050 tons of 130-lb. rail. At the end of the year, of the road's total main track mileage of 2,774, 1,325 was laid with 100-lb. rail and 58 miles with 130-lb. rail. These details concerning ties and rail will help give some idea of the Chesapeake & Ohio maintenance standards. With reference to ballast, the fact is brought out that the ballast used in existing tracks in 1921 totaled 626,034 yds. as compared with 891,058 yds. in 1920, a decrease of 265,024 yds. Considerably over half the ballast used in 1921 was of broken stone. With reference to the decrease in the amount of ballast used, the annual report points out that "Beginning 1921 careful survey was made of the ballast needed on the entire line, and while there was a decrease in the number of yards of ballast applied as compared with the previous year, our track has been fully maintained in equally as good condition as last year insofar as ballast is concerned." The general opinion would be that the reduction in expenses in 1921 was not due to any deviation from the maintenance standards of the road. One cannot, however, be so optimistic concerning the equipment maintenance. The total reduction in maintenance of equipment in 1921 as against 1920 was $4,556,439, or 18.5 per cent. The larger part of this decrease was in freight car repairs, the actual reduction in that account being $3,638,-367. The result is shown in a percentage of bad-order cars as of May 15 of 16.3 per cent, which seems very much too high to be entirely satisfactory.

With reference to transportation, the interesting fact is brought out that in spite of the falling off in traffic which was experienced during the year, the average train load was decreased only from 1,131 tons to 1,090 and the revenue car load showed an actual increase from 39.1 to 39.3. This, of course, was partly due to the larger proportion of coal, but the final result was that the road did not suffer as sharp a decline in its train load as most other roads. The transportation ratio in 1921 was only 37.6, which seems unusually favorable for the conditions which were met in that year.

Big Improvement Program

It has been noted in these pages in previous reviews of this kind that one of the Chesapeake & Ohio's principal difficulties is the fact that it has expanded its feeders into the coal fields, somewhat faster, if anything, than its operating conditions could take care of to best advantage. This expansion was continued in 1921 and the mileage shows a slight increase over 1920. However, the road has been taking important measures to remedy the situation with which its expansion in recent years has caused it to be confronted. The list as given in the report concerning the improvements to terminals, etc., is an imposing one. With reference to this matter the report says, "The officers of your company have also prepared a comprehensive budget of additions, betterments and improvements which should be made during the next four years in order to adequately and economically accommodate the present day maximum volume of traffic, provide for anticipated growth and render its facilities more nearly equal to those of your principal competitors. The estimated capital charge for the work contemplated by this budget is about $17,000,000, the expenditure of which will be spread over the next four years. Conditions at the present time are reasonably favorable for railroad financing and plans are now under consideration for providing at least a part of the total capital expenditure involved, announcement respecting which will be made in due course." During 1921 the road carried out the following work: Line and grade revision on the Coal River district between St. Albans, W. Va., and Ferrell, 4.2 miles, including the elimination of a tunnel which work will permit the use of the road's heaviest equipment on this district; 9½ miles of second track on the Logan division; yard extensions at Gladstone, Va., Hinton, W. Va., St. Albans, W. Va., Ashland, Ky., etc.; new shop buildings, roundhouse and other terminal facilities at Clifton Forge, Va.; several 100-ft. turntables at various points. The report also says that work is now under construction and should be completed in 1922 of new yard tracks at Peach Creek, W. Va., and of the addition of seven 100-car tracks at Gladstone, Va. It also says that automatic train control is being installed between Charlottesville, Va., and Staunton, 40 miles, which work should be completed this year, and when completed, will give a continual section from Gordonsville, Va., to Staunton, about 61 miles. The Chesapeake & Ohio has also recently placed orders for a large number of freight and passenger cars.

The Hocking Valley's Place in the C. & O. System

THE HOCKING VALLEY, which the Chesapeake & Ohio controls through majority stock ownership, is in large measure a main line division of the parent company and as such it constitutes its western outlet to the lakes at Toledo. The importance of its position can be indicated in no better way than by pointing out that in 1921 the Hocking Valley dumped into vessels at Toledo 4,540,000 tons of coal, which total was considerably more than that dumped at any other railroad pier on Lake Erie; in fact, there was no other pier that dumped over 3,000,000 tons. By way of comparison it might be further noted that the Chesapeake & Ohio in 1921 dumped at Newport News 4,312,619 tons of coal.

The Hocking Valley's main line extends from Valley Crossing, just south of Columbus, to Toledo. The road has a number of branches serving mines in southern Ohio, but the larger part of this tonnage is received from connections, notably, from the parent company. Connection with the latter is made by means of the Chesapeake & Ohio Northern to Waverly, from which trackage rights are used over the Norfolk & Western to Valley Crossing. The Hocking Valley is a modern railroad equipped with facilities of a somewhat unusual sort. Its main line is laid with 100-lb. rail and plans are under way for the use of some rail of 130-lb. section. The line is entirely rock ballasted and tie plates are used on all soft wood ties. The road has large yards at each end of its main line and at Toledo it has two car dumping machines of a modern type. The road's traffic is primarily coal, in 1920 the percentage of coal to the total tonnage being 76 per cent and in 1921, 84 per cent. Taking advantage of these conditions, it uses heavy engines and its average train load which in 1921 was 1,471 revenue tons, is one of the highest in the country.

Manner of Operation

Coal from the Chesapeake & Ohio reaches the Hocking Valley rails at Columbus, or, to be more exact, at Parsons yard just south of Columbus. This yard is a joint yard with the Chesapeake & Ohio and the trains of that road run through from Huntington, W. Va. The yard at Parsons has a capacity of about 5,000 cars. From Parsons to Toledo is 128 miles and is operated as one engine district. Mallet and Santa Fe type locomotives are used, both types being given a summer rating of 5,500 tons. The grade northbound or against traffic is 0.3 per cent except for the helper grade from Ackerman to Powell, 7 miles, of 0.5 per cent, which

grade is operated by the use of helpers from Parsons yard for a total of 20 miles. The main yard at Toledo is Walbridge yard having a capacity of 5,000 cars in addition to which there is a dock yard of 2,000 cars. The piers have two dumping machines capable of handling the 70-ton and 100-ton cars which the Chesapeake & Ohio is at present using to considerable extent in its coal traffic. These piers compare very favorably with the facilities at Newport News and in fact they can be operated at higher speed because they work with the lake ore boats with wide hatches, which boats can be loaded with much greater ease than the ocean going vessels which are loaded at Hampton Roads. On this line there is some double track, the mileage of which is gradually being extended. Further, there are a number of sidings of 80 cars which have not yet been extended to hold 100 car trains.

The road is also confronted with the necessity of increasing its yard capacity at Toledo. During the war, or when the method of pooling coal was followed, there were 19 classifications. Now that the pooling has been abandoned the number of classifications has been increased to 81 with the result that the road has had to put in new tracks at both Walbridge and Toledo itself to take care of the additional work required.

Larger Part of Traffic Received from Connections

It was noted above that the Hocking Valley dumped at Toledo in 1921, 4,540,000 tons of coal. By way of showing the percentage of this tonnage which is received from connections it may be pointed out that of the total, 2,975,000 tons were received from the Chesapeake & Ohio, 800,000 tons from the Norfolk & Western and a sizable quantity from the Kanawha & Michigan. During 1921 the mines on the Hocking Valley did not play a heavy part in the lake traffic. All of these facts are of present interest because the Hocking Valley mines have been hit very severely by the coal strike. The loadings in April and May have been at a minimum whereas in the corresponding weeks of last year they averaged about 800 cars weekly. This, however, should not hurt the Hocking Valley as much as might otherwise be the case because of the fact that it is presumably receiving a heavy tonnage of coal from the Chesapeake & Ohio and Norfolk & Western.

The 1921 Results

The results of the Hocking Valley's operations in 1921 were very similar to those of its parent company. It also had a severe falling off in traffic in the first few months of 1921 and in May the directors of the company deferred the semi-annual dividend of two per cent just as it was deferred in the case of the parent company, the result, of course, being reflected in the corporate income account of the Chesapeake & Ohio because the larger share of the dividends would accrue to the parent company. The Hocking Valley's net railway operating income in 1921 was $1,560,741 as compared with $1,577,963 in 1920. Its corporate income was only $14,306 as compared with $345,796 in 1920; in other words, the dividend of two per cent which was paid towards the end of the year and which amounted to $219,990 was paid from surplus and not from the year's results. By way of bringing the facts up to date it should be pointed out that the Hocking Valley at present is, like the parent company, in a very much better position than it was this time last year. For the first four months of 1922 it had a net after rentals of $967,674 as compared with a deficit in the first four months of last year of $635,225. For the first four months of this year it operated at a ratio of 68.5. The improvement this year over last year is further shown by the fact that the net ton-miles of freight (revenue and non-revenue) in the first three months of 1922 totaled 357,189,000 as compared with 223,249,000 in the first three months of 1921.

In 1921 as compared with 1920 the Hocking Valley had a decrease of 18.4 per cent in its freight revenues, a decrease of 17.6 in its total revenues, and it cut its operating expenses 27.4 per cent. For the year it operated at a ratio of 82.1 per cent, thereby reflecting the poor results of the first few months of the year. However, even this figure was an improvement over 1920 because in that year the operating ratio was 93.2. The improvement which the Hocking Valley carried out in 1921 was almost entirely due to its bituminous coal traffic. In 1920 it carried 11,567,594 tons of coal, which constituted 75.67 per cent of its total tonnage. The coal tonnage carried in 1921 was 10,781,334, a decrease of 786,260 tons from 1920. Because of the fact that the reduction in the tonnage of coal and coke was only 7.6 per cent whereas the reduction of other freight tonnage was 44.5 per cent, the percentage of coal tonnage in 1921 was 84.28 per cent. It is interesting in connection with what has been said above, that of the total coal tonnage carried in 1921—namely 10,781,334—8,209,614 was received from connections and only 2,571,720 originated on the Hocking Valley. The total tonnage of all commodities carried in 1921 was 12,793,175, of which 73.17 per cent was received from connections. The reduction from 1920 was 2,492,687, which figures out to 16.3 per cent. The freight revenues in 1921 were $11,924,979 as compared with $14,616,677 in 1920, a decrease of $2,691,698. The total operating revenues were $14,093,001 as compared with $17,101,493 in 1920, a decrease of $3,008,492. The total operating expenses in 1921 were $11,572,394 as compared with $15,941,435 in 1920, a reduction of $4,369,040, or as above noted, 27.4 per cent. The reduction in maintenance of way expenses was 16.8 per cent; in maintenance of equipment, 24 per cent, and in transportation, 25.7. The road put in track approximately the same number of ties in 1921 as in 1920, the 1921 figure being 277,868. The new rail laid in 1921 totaled 7,024 tons (nearly all of 100-lb. weight), as compared with 3,596 tons in 1920. The ballast used, 14,179 yards, approximately all stone, compared with 23,777 yards in 1920. The reduction of 34.1 per cent in maintenance of equipment produced a similar result as that which was produced in the case of the parent company. The Hocking Valley had a bad-order car percentage on May 15 of 24 per cent, which is several times normal and which indicates that Hocking Valley operating expenses will have to include a considerable sum for car repairs.

At the end of 1921 the Hocking Valley reported 8.8 additional miles of second track, the additions this year being between Marion and Morral. There were also additional yard tracks at Toledo dock, Walbridge and Parsons, the mileage of trackage at Walbridge being increased 3.02. The road reported that its revenue train load in 1921 was 1,471 tons, a decrease of three per cent from 1920. The revenue tons per loaded car were reported at 45.5 tons which, like the average train load, is unusually high. The figure, however, was a decrease of 1.9 per cent from 1920. Some idea of the Hocking Valley operations will further be gained by the statement that its revenue tons one mile per mile of road, or traffic density, was in 1921, 4,485,562 and that even this high figure was a decrease of 20.4 per cent from 1920.

J. E. FAIRBANKS, general secretary of the American Railway Association, announces that, by a vote of the members of the association, the proposition, recently promulgated, to cancel car service rule 17 has been approved, to take effect July 1, 1922; also that the rule adopted May 17, 1911, relative to penalty payments for delay or diversion to private car lines, has been cancelled, effective July 1; also that changes in per diem rule 6, recommended in circular 2260, May 25, are approved, the amended rule to become effective on July 1. A change in per diem rule 15, paragraph c, also promulgated on May 25, has likewise been approved, to become effective on July 1.

Rail and Water Transportation Provisions in Ship Subsidy Bill

THE REVISED SHIP subsidy bill, as reported to the House on June 16, contains the following provisions relating to rail and water transportation:

SEC. 602. (a) It is hereby declared to be the policy of Congress to promote, encourage, and develop water transportation, service, and facilities in connection with the commerce of the United States, and to foster and preserve in full vigor both rail and water transportation, and the board and the commission are hereby severally authorized, empowered, and directed to co-operate to that end.

(b) The (Shipping) board and the (Interstate Commerce) commission are authorized and directed to create a joint board, selected from among their members, officers, and employees, to study the conditions and interrelations of rail and water traffic, and the principles and methods essential to accomplishing the policy declared in subdivision (a).

(c) The joint board shall appoint a secretary who shall keep minutes of its meetings, which minutes shall be furnished to the members of the board and of the commission. The joint board shall hold regular semimonthly and such additional meetings as may be necessary to transact properly its business.

(d) The joint board shall formulate and make such recommendations to the board and the commission, not inconsistent with law, pertaining to the interrelations of rail and water traffic, as it deems necessary to accomplish the policy declared in subdivision (a). The board shall make effective, by such means as are granted it by law, any such recommendation upon any matter within its jurisdiction, if such recommendation is approved by the board. The commission shall have a like duty as to any such recommendation upon any matter within its jurisdiction.

(e) None of the provisions of this section shall be construed to affect the power or jurisdiction of the commission, or to confer upon the board concurrent power or jurisdiction over any matter within the power or jurisdiction of the commission.

SEC. 603. Paragraph (4) of section 25 of the Interstate Commerce Act, as amended, is amended by adding at the end thereof a new sentence to read as follows: "In making rules and regulations prescribing the form of such through bills of lading, the commission shall adopt as the portion thereof governing the carriage of goods by water in foreign commerce such form as may be certified to the commission by the United States Shipping Board for such purpose."

SEC. 604. Paragraph (9) of section 5 of the Interstate Commerce Act, as amended, is amended by striking out the period at the end thereof and inserting in lieu thereof a colon and the following. *"Provided,* That the foregoing provisions of this paragraph shall not apply in any case where such common carrier by water or such vessel is engaged exclusively (a) in trade (other than with foreign contiguous territory) not included in the coastwise trade, or (b) in trade between ports in the United States and ports in the Philippine Islands."

SEC. 605. Section 15 of the Shipping Act, 1916, is amended to read as follows:

"SEC. 15. (a) That every common carrier by water, or other person subject to this act, shall file immediately with the board a true copy, or, if oral, a true and complete memorandum, of every agreement with another such carrier or other person subject to this act, or modification or cancellation thereof, to which it may be a party or conform in whole or in part, fixing or regulating transportation rates or fares; giving or receiving special rates, accommodations, or other special privileges or advantages; controlling, regulating, preventing, or destroying competition; pooling or apportioning earnings, losses, or traffic; allotting ports or restricting or otherwise regulating the number and character of sailings between ports; limiting or regulating in any way the volume or character of freight or passenger traffic to be carried; providing warehousing, docking, or other terminal facilities; providing that the one carrier shall act in any manner as agent or representative of the other carrier; or in any manner providing for an exclusive, preferential, or co-operative working arrangement.

"(b) Every common carrier by water shall file immediately with the board a true copy, or, if oral, a true and complete memorandum, of every agreement with a common carrier by railroad subject to the provisions of the Interstate Commerce Act, as amended, or modification or cancellation thereof, to which it may be a party or conform in whole or in part, relating to the interchange of freight or passengers, or the making of joint or through rates, or providing warehousing, docking, or other terminal facilities, or providing that the one carrier shall act in any manner as agent or representative of the other carrier, or in any manner providing for a co-operative working arrangement between the two carriers. In all such cases the common carrier by railroad shall also have a like duty. The provisions of this subdivision shall apply only to agreements relating to passengers or property transported or to be transported to or from a foreign country or the Philippine Islands from or to a port or other place in the United States.

"(c) The term 'agreement' as used in this section includes understandings, conferences, and other arrangements.

"(d) The board may by order disapprove, cancel, or modify any agreement, or any modification or cancellation thereof, whether or not previously approved by it, that it finds to be unjustly discriminatory or unfair as between carriers, shippers, exporters, importers, or ports, or between exporters from the United States and their foreign competitors, or to operate to the detriment of the commerce of the United States, or to be in violation of law, or to be otherwise detrimental to the interest and welfare of the United States, and shall approve all other agreements, modifications, or cancellations.

"(e) Agreements existing at the time of the enactment of the Merchant Marine Act, 1922, shall be lawful until disapproved by the board. * * *

"(f) All agreements, modifications, or cancellations, made after the enactment of the Merchant Marine Act, 1922, shall be lawful only when and as long as approved by the board, and before approval or after disapproval it shall be unlawful to carry out in whole or in part, directly or indirectly, any such agreement. * * *

"(h) Whoever violates any provision of this section shall be liable to a penalty of $1,000 for each day such violation continues, to be recovered by the United States in a civil action."

SEC. 606. Paragraph (d) of paragraph (13) of section 6 of the Interstate Commerce Act, as amended, is amended to read as follows:

"(d) If any carrier by railroad subject to this act enters into arrangements lawful under section 15 of the Shipping Act, 1916, as amended, with any carrier by water operating from a port in the United States to a foreign country, for the handling of through business between interior points of the United States and such foreign country, the commission may require such carrier by railroad to enter into similar arrangements with any or all other carriers by water operating from such port to the same foreign country, but such arrangements shall be subject to the provisions of section 15 of the Shipping Act, 1916, as amended."

SEC. 607. Section 28 of the Merchant Marine Act, 1920, is amended to read as follows:

"SEC. 28. (a) That no common carrier shall charge, collect, or receive, for transportation subject to the Interstate Commerce Act, as amended, of passengers or property, under any joint rate, fare, or charge, or under any export, import, or other proportional rate, fare, or charge, which is based in whole or in part on the fact that the passengers or property affected thereby are to be transported to, or have been transported from, any port in a possession or dependency of the United States, or in a foreign country, by a carrier by water in foreign commerce, any lower rate, fare, or charge than charged, collected, or received by it for the transportation of passengers, or of a like kind of property, for the same distance, in the same direction, and over the same route, in connection with commerce wholly within the United States, unless the vessel so transporting such passengers or property is, or unless it was at the time of such transportation by water, documented under the laws of the United States.

"(b) Whenever the board is of the opinion, however, that adequate shipping facilities to or from any port in a possession or dependency of the United States or a foreign country are not afforded by vessels so documented, it shall certify this fact to the Interstate Commerce Commission, and the commission shall, by order, suspend temporarily the operation of the provisions of this section with respect to the rates, fares, and charges for the transportation by rail of passengers and property transported from, or to be transported to, such ports.

"(c) Such suspension of operation of the provisions of this section shall be terminated upon 30 days' notice, given in accordance with the requirements of section 6 of the Interstate Commerce Act, as amended, by order of the commission whenever the board is of the opinion that adequate shipping facilities by such vessels to or from such ports are afforded and so certifies to the commission.

"(d) Whenever the board and the commission are both of opinion, and certify, that putting into effect or keeping in effect the provisions of this section will result in unjust discrimination between ports of the United States on commerce accustomed to move through such ports, or in materially changing the channels of transportation within the United States, or in unduly congesting one or more of the ports of the United States, the commission shall, by order, suspend the operation of said provisions until such time as it and the board reach a contrary conclusion in the premises, whereupon such suspension shall, by order, be terminated by the commission upon 30 days' notice as hereinbefore provided for the termination of other suspensions."

Train Control Ordered on Forty-Nine Roads

Tentative Order of January 10, to Which Roads Objected, Made Permanent Without Important Change

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION on June 15 made public an order, dated June 13, that the tentative order of January 10 directing the 49 railroads named therein to instal automatic train stop or train control devices upon designated portions of their roads, should be entered, and that the installations prescribed should be completed by January 1, 1925. The list of railroads and, with two exceptions, the portions of road designated are the same as published in connection with the tentative order in the *Railway Age* of January 14, 1922, page 189. The points between which the Cincinnati, New Orleans & Texas Pacific is required to make the installation have been changed to Cincinnati and Chattanooga instead of Cincinnati and Knoxville; and in the case of the St. Louis-San Francisco Springfield, Mo., and Tulsa, Okla., are substituted for St. Louis and Springfield. The railroads are those having annual gross revenues of $25,000,000 or over. It is required that the train control device be operated in connection with all road engines running on or over at least one full passenger locomotive division between the points designated.

The roads are required to submit to the commission complete and detailed plans and specifications for the installation of the devices prior to the installation, and each installation when completed will be subject to inspection by and the approval of the commission or any division thereof to which the matter may be referred.

The date for the completion of the installation is set six months beyond that named in the tentative order; and the time within which the roads are required to furnish plans of their block signal systems and lists showing the number and types of their locomotives is extended six months, or until January 1, 1923. The roads are directed to proceed without unnecessary delay to select and instal the devices, and to file with the commission, on or before January 1, 1923, and on the first day of each month thereafter, full and complete reports of progress. However, the Pennsylvania and its controlled lines, and the Norfolk & Western, for good cause shown, are allowed until July 1, 1923. The Pennsylvania, however, will be required to file plans and reports beginning July 1, 1922, for the installation (now being made) upon its Lewistown division between Lewistown and Sunbury, Pa.

The specifications and requirements for the installation of automatic train stop or train control devices adopted by the commission and prescribed in its order are the same as those in the tentative order, omitting the permissive feature which was in the specifications of the A. R. A. committee. The order itself is substantially in the form of the tentative order, as to which the roads were given an opportunity to show cause at the hearings (in March) why it should not be put into effect.

For the benefit of systems including two or more of the roads specified the report says that those which may desire to adopt a device as standard on each of their roads may test the device on one road and during such test will not be expected to make the additional installations.

An abstract of the commission's report follows:

Report of the Commission

This is a proceeding under Section 26 of the interstate commerce act which authorizes us, after investigation, to prescribe the installation of automatic train-stop or train-control devices or other safety devices, upon the whole or any part of the railroad of any carrier by railroad subject to the act.

On January 10, 1922, we entered an order under which certain specified carriers, were given an opportunity to show cause, if any, why an order should not be entered requiring the installation of automatic train-stop or train-control devices upon designated portions of their lines. Hearings have been had at which all the respondents, except nine, were represented by a general committee [C. E. Denney, chairman], and at which carriers individually presented data and arguments.

Respondents represented by the committee opposed generally the entry of an order at this time upon the grounds—*First*, that there has not been any automatic train-stop or train-control device developed to an extent which would justify the issuance of an order. *Second*, that the carriers have not had opportunity to make adequate service tests of devices which differ fundamentally in their principles of operation from those now installed and in operation under service conditions, which were referred to in our report. *Third*, that every reasonable effort is being made by the carriers to co-operate with the commission for the purpose of testing and developing devices which will best meet operating requirements. *Fourth*, that the order requires a much greater number of and more extensive installations than are warranted, in view of the present state of the art. *Fifth*, the costs of installation and maintenance of automatic train-stop or train-control devices are high and not within the present financial abilities of the roads. In connection with this objection it is contended that it should first be determined whether automatic train-stop or train-control devices will provide equal or greater additional safety for a specified expenditure than a like expenditure for automatic block signals, double track extensions, interlocking plants, additional steel equipment, under crossing and grade separation; most of which, it is urged, not only increase safety but increase the capacity of a railroad and produce economies in operation.

Supplementing the general objections special objections were raised by many carriers to the entry of an order requiring installations upon their respective lines. Proprietors and manufacturers of automatic train-control devices were also heard.

[Here follows a history of what the commission has done in this field since 1906, concluding with the opinions formed by the Block Signal and Train Control Board and the Bureau of Safety.] The conclusions reached as a result of the investigations conducted from 1906 to 1920 were that automatic control of trains is practicable; that the use of such devices is desirable as a means of increasing safety, and that the development of devices had reached a stage warranting the installation and use of such devices on a more extended scale. The results of these investigations, which had been reported by us year by year to the Congress, and the recognized need for some such device resulted in the inclusion in the transportation act, 1920, of a section which places upon us the duty, after investigation, of ordering the carriers or any of them to install upon the whole or any part of their lines automatic train-stop or train-control devices or other safety devices, which comply with specifications and requirements prescribed by us.

Following the enactment of that section we were urged to order the installation of various automatic train-control devices. * * * In order to carry out the provisions of Section 26 in the most effective and expeditious manner, we invited the co-operation of the American Railway Association. A joint committee on automatic train control consisting of representatives of the signal section and the operating, engineering and mechanical divisions of that association was appointed in November, 1920. * * *

The essential safety function of any automatic train-stop device is to stop a train where a dangerous condition exists ahead of the train, when the engineman for any cause fails to take proper action to stop. Several types of apparatus have been designed to do this. Additional features have been introduced so as to afford speed control, whereby a train may be brought down automatically to a predetermined safe speed at certain fixed locations which are established with relation to the fixed signals of a block system.

In the most recent development of automatic train-control devices, continuous control is obtained whereby the engineman is not dependent upon indications received at fixed locations, but is immediately made aware of a change in condition ahead of his train and may act promptly to govern his train accordingly. * * *

Various Types Available

To secure the latest data pertaining to actual operations a questionnaire was sent in December, 1920, to all carriers request-

ing detailed information; and replies were received from the following eleven carriers upon the lines of which such devices are installed: Chicago & Eastern Illinois; Chicago, Rock Island & Pacific; Chesapeake & Ohio; Pennsylvania; Hudson & Manhattan; San Francisco-Oakland Terminal; Washington Water Power Company; Brooklyn Rapid Transit Company; Philadelphia Rapid Transit Company; Boston Elevated Railway; and Northwestern Elevated Railroad.

Observations have been made by the joint (A. R. A.) committee, in connection with our Bureau of Safety, of the performances of devices of the ramp type upon portions of the Chicago & Eastern Illinois in May, June and July, 1921, and for the months of February and March, 1922; upon the Chesapeake & Ohio from August 16, 1921, to March 31, 1922, and upon the Chicago, Rock Island & Pacific from May, 1921, to March 1, 1922. The joint committee has co-operated with us in making the observations and has rendered valuable aid.

Each road stated, in response to the questionnaire, that the device adequately met the operating requirements in the location where installed. As it was desired, however, to obtain more complete data, inspectors of the Bureau of Safety and of the joint committee were detailed to observe and report upon the operation of the devices. Data have been gathered upon the effect of the devices upon railroad operating conditions, upon problems of installation and maintenance upon an extended scale, upon installation and maintenance costs, and upon the revisions made or required in the devices.

The installation upon the Chicago & Eastern Illinois is upon 105.4 miles of double track from Danville to Yard Center, Ill. There are 174 signals and 175 ramps; 85 engines equipped, 47 passenger and 38 freight. The device has been in continuous service since November 1, 1914.

The installation upon the Chesapeake & Ohio is upon 21 miles of single track from Gordonsville to Charlottesville, Va. There are 67 signals, and 67 ramps; 37 engines equipped. The device was placed in service upon 7 miles of road in March, 1917, and upon 14 additional miles in June, 1919. An extension of this installation 40 miles, to Staunton, Va., is under construction and will probably be completed by August, 1922.

The installation upon the Chicago, Rock Island & Pacific is upon 22.4 miles of double track from Blue Island to Joliet, Ill. There are 34 signals and 34 ramps; 20 engines equipped. The device has been in service since March, 1920. This installation will be extended to Rock Island, Ill., a distance of 142 miles.

Record of Three Installations

The following is a summary of the facts observed, totalled for the three installations observed (The Rock Island, the C. & E. I. and the C. & O.):

Miles of road equipped		148.8
Miles of track equipped		276.6
Total engines equipped		142
Total indication points		276
Total signals		275
Total mileage of engines in equipped zone		721,581
Total operations of train-control device (passage of equipped engine, with device in service, over an indication point counted as one operation)		659,875
Proper operations—Clear		656,045
	Caution	2,053
	Stop	945
		659,043
Failures—		
False clear		15
Other causes resulting in stops to the number of		341
Undesirable stops—		
Due to train-control device		73
Due to signal failure		418

An undesirable stop is one which occurs when there is no operating or traffic condition which requires the stop to be made. Where the train-control device causes a stop under such conditions the action is upon the side of safety. It is undesirable, however, from an operating point of view. A false clear failure on the other hand is one in which the train-control device indicates by its action or lack of action, that no danger exists, when as a matter of fact, the contrary is true. Failure in this case is a dangerous one.

These three installations which have been under close observation are of the ramp type and the record indicates that automatic train-control devices of this type are practicable under actual service conditions; that they properly perform the functions for which they are designed, and that when properly installed and maintained they unquestionably increase the safety of train operation. The record holds out expectation of satisfactory tests and operation of the other types of train-control devices.

Undesirable Features May Be Corrected

The respondents called attention to many features of construction and operation of ramp type devices which they classed as undesirable and which, they urge, should be eliminated before the devices may reasonably be said to operate to a degree of efficiency warranting the issuance of an order requiring their installation as safety measures. From the close and detailed observations which have been made we are convinced that the features claimed to be undesirable are not such as cannot be corrected, as the systems are utilized extensively: in fact, some of them have already been corrected. The discovery and the elimination of undesirable features is a natural growth, inevitable in the development of the art, such has been the history of the development of the automatic block signals, of the air brake and of the automatic coupler.

Carriers who have stressed the difficulties of the ramp type urge that more time should be allowed in which to test induction devices. Two devices of the magnetic induction type are now installed for test purposes, one upon the Southern Pacific [the National] and the other upon the New York Central [the Sprague]. Arrangements have been completed for a test installation of another device of the induction type upon the Delaware, Lackawanna & Western [the Finnigan]. One device of the continuous control induction type is now being installed upon the Pennsylvania [the Union] upon 52 miles of track between Lewistown and Sunbury, Pa., and arrangements have been made by the Pere Marquette Railway for a test installation of another continuous control device of the induction type [Clark's].

Effect on Track Capacity

Respondents, through their committee, state that the installation of automatic train control devices upon lines handling heavy traffic will tend to slow up train movements, decrease track capacity, and, therefore, may require the addition of more running tracks to accommodate the same volume of traffic. * * * It is obvious that this difficulty arises only upon roads and portions of roads now operating to full capacity, or nearly so. The problem is one not generally confronting all the respondent carriers. * * * In some locations a simple automatic stop will be adequate, in others speed control may be necessary or desirable or automatic stops on part of the line and speed control on other parts where traffic is heavy may be needed. * * *

Cost of Installation

The cost per mile of road and per mile of track can not be stated generally. The cost for locomotive apparatus and for roadside or track apparatus will therefore be given together with the cost of the installations which have been under observation.

From the various figures submitted by respondents and by proprietors and manufacturers, it appears that the cost of locomotive apparatus for an intermittent control device of the ramp type ranges from $400 to $1,000; for an intermittent control device of the induction type, from $375 to $2,100, and for a continuous control device, induction type, from $1,000 to $3,000. Assuming one indication point per block the cost of track equipment of the ramp type is from $200 to $550 per block; of the induction type, intermittent control, from $400 to $2,000 per block, and of the induction type, continuous control, from $300 to $1 000 per block. These prices cover installation costs and are stated to be the maximum prices for each unit of the particular device. They may be reduced when the apparatus is manufactured and installed upon a large scale. * * *

Maintenance Costs

Maintenance costs have been ascertained in connection with the installations that have been under observation as follows:

On the Chicago & Eastern Illinois installation the average maintenance cost per locomotive, per month, over a three months' period was $13.02; per ramp, per month, over same period, $2.74; per mile of track, per month, $2.27. On the Chesapeake & Ohio installation the average per locomotive per month over a six months' period was $12.23; per ramp per month over same period. $5.68; per mile of track per month, $18.12. On the Rock Island installation average per locomotive per month over a nine months' period was $110.33; per ramp per month, $12.43; per mile of track per month, $9.44.

The above figures were compiled from monthly statements furnished to the joint inspectors by the railroad companies and the train-control companies. The maintenance figures for the Rock Island installation represent much higher maintenance costs than would be required under normal operating conditions, because of the nature and extent of the tests conducted during the observation period. The proprietors of this device state that, based upon their experience, the average annual cost of maintenance per mile of track on a double-track division, consisting of 165 miles of road with 120 equipped engines and 273 ramps, will be $54.69, or a total cost per annum of $18,047.88.

Many of the respondents have filed estimates of the cost of installation upon selected portions of their roads, comprising passenger locomotive divisions, which show a much higher cost than those indicated in the foregoing figures. The estimated figures show a wide variation both for engine equipment and roadway equipment. The differences are due in part to the type

of device selected and the measure of control to be secured and in part to the varying number of locomotives to be equipped and the number of indication points upon the road.

With these figures as bases, they urge that a greater degree of safety might be secured by spending the money to eliminate grade crossings, to extend their automatic block signal systems, and interlocking plants, and to construct additional tracks. All of these are unquestionably desirable. Automatic train control, however, will still be a necessary safety measure when all of these things shall have been completed. The compensation from a financial standpoint which will result from securing added safety should not be overlooked, however, when costs are being considered.

Cost of Collisions

The accident reports made by the railroads to us show that from January 1, 1906, to December 31, 1921, there were 26,297 head-on and rear-end collisions. These resulted in death to 4,326 persons and injury to 60,682. The damage to railway property alone amounted to $40,969,663. The annual average of these collisions amounted to 1,643, the average number killed, 270, and the average number injured, 3,792. The average damage to railroad property amounted to $2,560,603 per year. Losses due to damage to lading are not included in these figures but they are no doubt considerable. If to the large property losses there be added the death losses and the damages paid for persons injured, the total amount will be very great. As an indication of what these latter losses are, a number of carriers have furnished us with the death and personal injury claims paid by them as a result of a number of accidents.

New York, New Haven & Hartford, for example, paid $412,210 upon death and injury claims as a result of a collision at North Haven, Conn., on September 2, 1913, in which 21 persons were killed and 42 injured; $131,543 for like claims from a collision at Milford, Conn., on February 22, 1916, in which 10 persons were killed and 152 injured; and $29,580 for like claims from a collision at Norwood Junction, Mass., on March 17, 1921, in which 4 were killed and 11 injured. The total claims paid for these three accidents amount to $573,335.

The Delaware, Lackawanna & Western as a result of a collision at Corning, N. Y., in 1912, which caused the death of 39 persons and injury to many others, paid out in death and injury claims $326,133; for a similar accident at Ackerman, Pa., in 1919, in which 3 persons were killed and 2 injured, it paid for death and injury claims $10.469. In ten years from 1912 to 1922 it paid for death and injury losses a total of $367,360, for 12 collisions, including the two mentioned. These, it is admitted, might have been prevented by an automatic train control device.

The New York Central paid death and personal injury claims in the amount of $226,616 as a result of a collision at Amherst, Ohio, in March, 1916, in which 23 persons were killed and 125 injured; $356,478 for like claims from a collision at South Byron, N. Y., in January, 1919, in which 22 persons were killed and 183 persons were injured; $201,119 as a result of a collision at Schenectady, N. Y., in June, 1920, in which 15 were killed and 47 injured. As a result of a collision at Porter, Ind., in February, 1921, in which 37 were killed and 124 injured, the cost for death and personal injury claims is estimated at $175,000. Thus in these four accidents such payments amounted to $959,214.

We are convinced that the carriers can, if they are determined to do so, readily install upon their roads devices which will meet the requirements of safety and which at the same time will not unduly interfere with operating requirements. Had the railroads taken prompt action when the Block Signal and Train Control Board pointed the way in 1911, the art would have been far advanced today. Many of the operating problems, such as interchangeability, effect on track capacity, and others which respondents have stressed in this proceeding, would have been solved. The development of the automatic block signal system to its present state of efficiency is evidence of what can be accomplished.

It is evident from the record that automatic block signals were primarily installed as a means of increasing the capacity of existing lines. This very fact, however, increases the possibility of accidents. Much has been done to furnish the engineman with reliable information, by means of wayside signals, of the conditions of the track ahead but progress has been slow in providing means to automatically compel obedience to the signal indications. The fact remains that the correct operation of trains in compliance with the signals still depends entirely upon the knowledge, alertness and skill of the engine crew. The danger is ever present that the engineman may fail to observe, correctly interpret and obey the signals. * * *

Experimental Stage Passed

Our investigations have shown that the art of automatic train control has long since passed the experimental stage. The 15 years of investigation and study and the results obtained in the actual employment of these devices over periods of years upon some of the railroads have clearly demonstrated the practicability of and the necessity for automatic train-stops or train-control. The time has now arrived when the carriers should be required to select and install such device or devices as will meet our specifications and requirements.

Time for Compliance

* * * The fixing of a time limit should be based upon a consideration of the time which has already run since the passage of the act and the progress and present state of the art. There should be considered also the time reasonably required to enable the carriers to select suitable devices from among those available, to develop them to meet their operating conditions and requirements in the designated locations and to provide for the manufacture and installation of the apparatus.

Some of the respondents contend that devices of the ramp type are unsuited to their needs and hence undesirable. They state that devices employing the induction principle will better meet their requirements and therefore desire more time in which to test such devices. This is necessary, they believe, because there has been relatively less development of the induction type as compared with the ramp type. Proprietors and manufacturers of devices of the induction type support, in some measure, this request, because they are of the opinion that unless more time is allowed, respondents will perforce be limited to the employment of devices of the ramp type. The request for additional time was made by respondents in their answers and at the hearing. Although the proposed order was issued on January 10 of this year, it appeared at the close of the hearings on April 15 that only a few of the respondents had made arrangements or were contemplating making arrangements to make the tests which they consider to be necessary.

We do not desire to force any carrier to adopt a particular type which it believes is not entirely suitable to its peculiar needs, if there are others available which, within a reasonable time, may be shown to be more suitable. In view, however, of the investigations which have already been made and the time which has elapsed, we are of the opinion that a six months' period will give sufficient time for any road to decide upon the device it should select. Within this time, provided a sufficient installation is made and intensive tests of the device are conducted, it can be determined whether or not the device will be suitable.

Respondents will be required to make monthly reports to us, during the six months' period beginning July 1, 1922, of their arrangements for such tests and of the progress made.

Requirements and Specifications

The definitions, functions, requirements and specifications which we have adopted are set forth in the appendix. They are based upon the facts developed in our investigations and upon the requisites laid down by the Block Signal and Train Control Board in its report in 1910, the requisites of the Railway Signal Association reported in 1914, the requisites of the American Railway Association adopted in 1914, and of the automatic train control committee of the United States Railroad Administration adopted in 1919, together with those adopted by the joint committee on automatic train-control of the American Railway Association in March, 1921.

Permissive Feature Eliminated

We have eliminated the provision in the specifications of the joint committee under which the engineman would be permitted, if alert, to forestall the automatic brake application and proceed. Some of the respondents object to the elimination of this provision. They contend that, in many instances, it is proper for a train to pass an automatic block signal in the stop position, and that there are so many such conditions that the elimination of the manual control provision practically eliminates the simple automatic stop from consideration. * * * Where the device is made subject to the manual control of the engineman so that he may prevent the automatic brake application according to his own judgment of the conditions, the automatic safety feature of the device is, to that extent, nullified. It is assumed, by the proponents of manual control, that no engineman, if alert to a dangerous situation, will deliberately cut out the automatic stop device. The proper use of the manual control would depend, therefore, upon the judgment of the engineman. His judgment would be the determining factor in situations of known or unknown danger. This factor of human judgment is the factor which an automatic train-stop device is designed to eliminate. The manual control feature is, in our opinion, a dangerous one which will permit the judgment of the engineman to intervene and thus may prevent the essential function of the train-stop device, namely, its automatic operation is cases of emergency.

The respondents, required to install upon designated portions of their respective roads, automatic train-control devices in accordance with our specifications and requirements, have been selected with regard to the measure of the risk of accident in

connection with traffic conditions thereon. Some of the respondents called attention to their records of operation to show that there have been relatively few accidents of the character which automatic train-control devices are intended to prevent, and that the possibility of such accidents is relatively remote. These respondents therefore request that they be excluded from the provisions of our order. The reasons advanced do not, however, appear to be sufficient justification for such action.

We have decided not to limit by our order the installation of automatic train-control devices to roads or portions of roads already equipped with automatic block signals, because we have no desire to discourage efforts to automatically control trains without the aid of fixed wayside signals. The statement, therefore, of the primary function of automatic train-stop or train-control devices recognizes the possibility of installing such a device without the use of automatic block signals.

Freight Car Loading

WASHINGTON, D. C.

LOADING of revenue freight during the week ended June 10 totaled 846,002 cars compared with 750,645 cars during the previous week, or an increase of 95,357 cars, according to reports received by the Car Service Division of the American Railway Association. A large amount of the increase was due to the fact that the previous week had included the Decoration Day holiday but there was an increase of 24,871 as compared with the week before the holiday. The loading for the week of June 10 also came within 33 cars of the largest loading for any week this year preceding the coal strike, the week of March 25.

Compared with the corresponding week of last year, there was an increase of 58,719 cars, but as compared with the corresponding week of 1920, the total for the week of June 10 represented a decrease of 84,974 cars. If the same amount of coal had been loaded as in 1920, the loading would have exceeded that of 1920.

Increases as compared with the corresponding week of last year were shown in the loading of all classes of commodities except grain and grain products and coal. The coal loading, 94,824, was larger than for any previous week during the strike, but represented a decrease of 67,074 as compared with the corresponding week of 1921 and of 96,670 as compared with 1920. This was an increase, however, of 8,000 cars as compared with the preceding week.

Merchandise and miscellaneous freight combined, which includes manufactured products, totaled 563,640 cars, an increase compared with the corresponding week of last year, of 93,988, and an increase of 35,702 as compared with the corresponding week two years ago.

Grain and grain products loading amounted to 40,035, a decrease of 905 cars as compared with last year. Livestock loading totaled 29,765, an increase of 794 cars.

The loading of coke, 9,008 cars, represented an increase of 4,124 cars as compared with last year and the loading of forest products, 62,355, was an increase of 11,329 cars, while ore loading, 46,372, showed an increase of 16,463.

Compared by districts, increases as compared with the corresponding week of last year were shown in all districts except the Allegheny and the Eastern. In the Pocahontas and Southern districts there are increases as compared with 1920.

The Car Service Division has compiled charts indicating the extent to which the average loading in tons of selected manufactures and miscellaneous commodities utilized car capacity in 1920 and 1921. The first chart shows the average tons per car loaded, by quarterly periods, separated as to eight selected commodities. Sewer pipe and drain tile, fertilizer, chemicals and explosives, and canned goods all made a very much poorer showing from a tonnage standing in 1921 than in the previous year. Paper, printed matter and books, with the exception of the first quarter, also loaded considerably less tons per car, the last quarter making an especially low record. On the other hand, it is encouraging to note that automobiles and trucks, a high class commodity, and ice, a low class commodity, both being bulky freight, made a very much better record on the average than in 1920. Freight not otherwise classified, and coming under the heading "other manufactures and miscellaneous" also shows an improvement in 1921.

Car Surplus Decreases

The freight car surplus for the period from June 1 to 8 was 284,189, a decrease in approximately a week of 21,009. Of the total 65,161 were box cars and 180,831 were coal cars.

The percentage of bad-order freight cars in June 1 was 15 as compared with 14.7 on May 15.

REVENUE FREIGHT LOADED

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, JUNE 10, 1922

District	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous	Total revenue freight loaded: This year 1922	Corresponding year 1921	Corresponding year 1920
Eastern	1922	8,996	3,132	7,666	1,463	5,835	3,354	70,834	89,925	191,205	.....	.....
	1921	7,194	3,271	44,374	1,031	6,262	2,245	58,625	71,646	.....	194,648	223,389
Allegheny	1922	2,715	2,471	16,708	4,620	3,114	6,966	51,662	72,713	160,969	.....	.....
	1921	2,454	3,355	51,684	2,371	2,969	6,973	44,280	52,094	.....	166,180	199,644
Pocahontas	1922	217	158	31,002	238	1,441	27	6,465	4,173	43,721	.....	.....
	1921	181	153	24,687	160	1,287	26	5,120	3,469	.....	35,083	32,036
Southern	1922	3,532	2,407	25,830	779	19,563	1,195	38,090	41,163	132,559	.....	.....
	1921	3,392	2,349	18,359	445	14,570	648	35,620	34,769	.....	110,152	126,439
Northwestern	1922	10,418	8,404	6,942	1,536	17,893	32,512	31,096	38,477	147,278	.....	.....
	1921	11,460	7,323	5,362	627	13,869	18,582	27,222	31,345	.....	115,790	158,651
Central Western	1922	9,944	10,856	4,215	217	6,467	1,702	34,114	43,085	110,600	.....	.....
	1921	11,333	9,931	13,262	136	5,912	710	30,099	36,309	.....	107,692	128,646
Southwestern	1922	4,213	2,337	2,461	155	8,045	616	16,144	25,699	59,670	.....	.....
	1921	4,926	2,589	4,170	114	6,160	725	15,619	23,435	.....	57,738	62,171
Total Western districts	1922	24,575	21,597	13,618	1,908	32,405	34,830	81,354	107,261	317,548	.....	.....
	1921	27,719	19,843	22,794	877	25,941	20,017	72,940	91,089	.....	281,220	349,468
Total all roads	1922	40,035	29,765	94,824	9,008	62,358	46,372	248,405	315,235	846,002	.....	.....
	1921	40,940	28,971	161,898	4,884	51,029	29,909	216,585	253,067	.....	787,283	.....
	1920	34,408	27,591	191,494	11,543	62,978	75,024	164,637	363,301	.....	.....	930,976
Increase compared	1921	.....	794	.....	4,124	11,329	16,463	31,820	62,168	58,719	.....	.....
Decrease compared	1921	905	.....	67,074	.....	.....	.....	.....	.....	.....	.....	.....
Increase compared	1920	5,627	2,174	.....	.....	.....	.....	83,768	.....	.....	.....	.....
Decrease compared	1920	.....	.....	96,670	2,535	620	28,652	.....	48,066	84,974	.....	.....
June 10	1922	40,035	29,765	94,824	9,008	62,358	46,372	248,405	315,235	846,002	787,283	930,976
June 3	1922	37,931	27,792	86,626	8,927	58,923	31,552	217,254	281,640	750,645	693,903	828,907
May 27	1922	45,712	29,502	91,370	8,851	64,020	23,871	247,331	310,464	821,121	795,335	898,169
May 20	1922	42,772	29,133	81,967	9,335	61,930	16,917	243,971	306,434	792,459	770,991	862,074
May 13	1922	42,270	29,940	79,170	8,813	60,661	14,403	241,418	300,684	777,359	751,186	843,145

Addresses at the Accounting Officers' Meeting

Speakers Analyze Present Railway Conditions and Requirements from Accounting Viewpoint

THE ANNUAL MEETING of the Railway Accounting Officers' Association, held at Cleveland, Ohio, June 7 to 9, was addressed by Samuel O. Dunn, editor of the *Railway Age*, by Col. W. A. Colston, formerly director of the I. C. C. Bureau of Finance and now vice-president and general counsel of the New York, Chicago & St. Louis, and by S. Ennes, vice-president and general manager of the Wheeling & Lake Erie. Abstracts of the addresses follow:

The Railway Situation

By Samuel O. Dunn
Editor of the *Railway Age*

It seems to me that on the whole we may reasonably anticipate that throughout the present year the financial results of railway operation will be somewhat better than they were last year. There does seem ground for hoping that we have entered or soon will enter a period when shippers will desist for a while from constantly attacking rates, when wages and working conditions will cease for a while to be the subjects of acute and dangerous controversy, and when, if the railways do not enjoy a period of real calm, they will at least not constantly be tossed about by a tempest which threatens to engulf them. Looking farther ahead, if we could reasonably hope that railway officers would be accorded some measure of that freedom to conduct their business which men are accorded in other lines of commerce and industry, we might anticipate a period of real prosperity for the railroads.

Probably it is not far from the truth to say that the future of the railways can and will be mainly determined by their own officers. Summarizing the matter roughly, there are two things that their officers must do if they are to do their part in bringing about a solution of the problem which will be fair and beneficial to all concerned. First, they must manage the properties honestly and efficiently and give the public good service at the lowest rates compatible with the rendering of good service. Secondly, they must build up an intelligent, healthy and friendly sentiment on the part of railway employees and the public toward the railways.

The Recent Rate Case

The opinion rendered by the Interstate Commerce Commission in the recent reduced rate case is a remarkable and historic document in some respects. In the first place, it is a high tribute to the honesty and efficiency with which the railroads are being managed. The commission is an arbiter between those who own and manage the railways, on the one side, and those who use and pay for their service on the other side. Now, the railroads for years have been criticized and attacked upon the grounds, among others, that their accounts have not been correctly kept; that their capitalization greatly exceeds their value, and that they have not been efficiently managed. Criticisms and attacks upon all these grounds were made against them in the recent rate case. Having heard both the attack and the defense and having weighed all the evidence presented by both sides, the Interstate Commerce Commission has held that all the major attacks have been without sufficient justification. To the credit and vindication of the accounting officers it found that the books and accounts have been correctly kept, and show the facts. In spite of all that has been alleged to the contrary, it has found that the present value of the railways as a whole is approximately $19,700,000,000. It has expressly held that there is no evidence of general inefficiency of management.

The commission, by prescribing the way in which the accounts of the railways have been kept for years, by requiring them to make detailed reports regarding all their operations and transactions, by having its examiners check their accounts and reports to see that they have been correctly made up, and by holding extended hearings in which their managers and officers have been subjected to the severest examination by members of the commission and by representatives and attorneys of adverse interests, has got for itself and given to the public more complete and reliable information regarding the way the railways have been managed than has ever been obtained and made public by any government body regarding any other class of business concerns. The findings of the commission in its opinion, therefore, constitute a remarkable vindication of the railways.

Of course, the commission does not say, and nobody would say, that they have been or are now managed with complete honesty or perfect efficiency. Many offenses have been committed and many mistakes have been made in their management in the past. There are still abuses which ought to be abolished. There still remain many ways in which efficiency can and should be increased. But this is true of concerns of every kind. On the whole it is very doubtful if any class of business men in America could have had all their work studied and all their transactions scrutinized as those of the managers of the railways have been and established a cleaner and more defensible record than the railway managers have.

The findings made by the commission should be very gratifying to the railway officers. They should have a great effect upon public sentiment. There are, however, some other things in the decision of the commission which are not only not gratifying, but disquieting.

The Rate of Return

Undoubtedly the most unsatisfactory feature of the decision is its ruling that in future 5¾ per cent will be treated as a fair average return upon their valuation as a whole. Of course, such a return would be a great improvement over the average of less than four per cent which the railways received during the time when under the commission's ruling in the 1920 rate case they were entitled to six per cent. But during the dismal period of struggle in which very few roads earned six per cent and many were trying merely to avert bankruptcy, their officers were at least stimulated by the expectation that if they ever did earn an average of six per cent they would be allowed to have it. Now, before they have even been able in a single month to earn that much they find what is held to be a fair return cut down from six per cent to 5¾ per cent.

The difference may seem small. It means, however, a reduction in the amount the railways may earn for interest, dividends and improvements of about $50,000,000 a year. It means a reduction in the amount of capital on which they will be able to pay a return at six per cent of about $800,000,000. It means that they have been deprived of the ability to raise this much new capital and to provide the public with the additional transportation facilities which the investment of it would have provided. And how much of a saving in rates can it mean to the American public?

About 45 cents per year per person, or less than one cent a week per inhabitant. Which does the American public need more—this less than one cent a week per capita, or the $800,000,000 investment in railway facilities which the commission's ruling makes impossible?

It is worth while to speculate upon the reason or reasons which caused the commission to make this reduction in the "fair return." The experience of the last 15 years does not indicate that after the recapture of one-half of all net return exceeding six per cent earned by individual railways the amount of return which would be left out of the 5¾ per cent would be sufficient to enable the railways as a whole to raise adequate amounts of new capital. Furthermore, past experience would be rather a dangerous guide to follow under present conditions in the money market of the world. It is true that interest rates are now lower and that in consequence all security prices are higher than a few months ago. In spite of this, however, the present market prices of American railway securities do not support the view that an average return of 5¾ per cent will be sufficient.

Probably the best test of whether it will be sufficient is afforded by the prices at which the bonds and stocks of the stronger companies are selling. All but their best secured bonds are selling at prices which yield five per cent or more, while the best dividend paying stocks are selling at prices which yield six per cent or more. Now, new bonds which may be sold will necessarily be less well secured than most of those now outstanding and will have to be sold for relatively lower prices than are commanded by those now outstanding. Furthermore, new issues of stock would have to be sold for less than the market prices now commanded by the present stocks of the companies issuing them.

The estimates of the amount of new capital which ought to be invested in railways annually vary widely, but probably the annual investment for some years to come should be at least one billion dollars. President Storey of the Santa Fe in a recent address estimated at one and one-half billion dollars for three years the new investment which ought to be made to bring the railways up to date. Can the railways, with the prospect of an average annual return of only 5¾ per cent on their valuation, reasonably hope to raise one and one-half billion, or even one billion, dollars of new capital annually?

If there is anything in the past experience of the railways to show that they can, there certainly is not in the past experience of any other industry. The average return earned in the banking business is at least twice that large. The banking like the railroad business is under government supervision, and yet nobody has proposed that it should be restricted to any such average return as the commission has held will be fair and sufficient for the railways. No other large industry would be satisfied with 5¾ per cent. In fact, the courts in many cases have held that to restrict public service concerns to less than six per cent was confiscatory.

It is remarkable that this ruling of the commission was received with little comment and almost no criticism by the press and general public. They took it as a matter of course that railways should be restricted to a rate of return which would not be considered sufficient in any other business. We should frankly recognize that this is because the commission's ruling was in accordance with the prevailing public sentiment. The public knows the courts have held that the net returns of railways and public utilities may be reduced and limited to any basis which is not confiscatory. It has been led to believe that because this can be done it is to the public's interest that it shall be done. There are very few who have ever considered the matter enough to have perceived that the least return to which the railways can constitutionally be restricted is not necessarily the return to which, in the public interest, they ought to be restricted. Perhaps, although it is doubtful, the courts would rule that the commission could restrict the railways to an average return of 5¾ per cent without violating the constitutional prohibition of confiscation. Suppose, however, that the public welfare demanded a large expansion of railway facilities and that the railways could not, unless they earned an average return of at least say, 6½ per cent, raise the necessary capital. Clearly, it would then be to the public interest not to restrict the railways to less than 6 per cent, but to let them earn at least 6½ per cent.

The fact that the press and public accept with little comment and virtually no criticism the ruling of the commission that the railways shall be restricted to an average return which is much less than is earned in other lines of business and which closely approaches, or actually crosses, the line of confiscation, strikingly illustrates the fact that the railroad problem never will be solved by the most honest and efficient management, essential as that is to its solution. It is also essential to the solution of the problem that the public shall be given a better understanding of railway matters, and especially that public sentiment more friendly to the railways shall be secured. The public must be made to understand that it is contrary to its own interest to have the railways regulated, as they have been in the past, on the principle that their average return should be restricted just as much as it can be without confiscating their properties. It must be made to understand that a prosperous railroad industry is just as essential to the welfare of the public as a prosperous agricultural or mining or manufacturing industry.

Public Opinion

The public, however, will never see and admit this, because it will be unwilling to see and admit it, until the suspicion and hostility which a large part of the people now feel toward the managements of the railways have been eliminated. Many of you may doubt if this suspicion and hostility still prevail. Unfortunately, one who reads all kinds of newspapers and magazines, and comes in contact with all classes of people, cannot fail to be convinced that in spite of the proof to the contrary which has been accepted by the Interstate Commerce Commission, there are still many millions of people who do believe that the railways are inefficiently operated; that they are grossly overcapitalized; that graft prevails extensively in the relations between their officers and outside concerns, and that excessive amounts of the rates they collect from the public find their way through some channel or other into the pockets of the "malefactors of great wealth" in Wall Street. The policies adopted by all of the regulating bodies are strongly influenced by this widely prevalent public sentiment, and the railways will never be able to get the regulation which they ought to have, in justice to the owners of their securities and to enable them properly and adequately to serve the public, until this public sentiment has been changed.

How is this atmosphere of suspicion and hostility to be cleared away? I think the first thing that must be done is to awaken the managers and officers of the railways to a vivid realization of the fact that the future of these properties does not lie in the hands of legislatures, commissions and courts, but in the hands of the public. Almost any railway officer to whom you make that statement will assent to it. It is so obviously true that nobody can dispute it. But while most railway officers accept the theory, it is a remarkable fact how comparatively few of them actually act in accordance with it. A great deal of work has been done to improve public sentiment, but the fact that public sentiment is still what it is today, demonstrates that this work has not been sufficiently effective either because there has not been enough of it, or because it has not been well done, or for both reasons. Too many unjust criticisms of the railways which for years have constantly been made throughout the

country have not been answered promptly, clearly and conclusively enough. In consequence the minds of many poeple have been filled with misinformation and prejudice. The good things the railroads have done and are doing to develop the country and to increase its prosperity by improving their service, making it more safe, and increasing the economy with which it is rendered, have not been told often and well enough.

This good side of the railroad business should be presented to the public through every available channel until the misconceptions and prejudices which prevail in the minds of so many people are destroyed.

Public Relations Work

I believe it is possible for the railways by carrying on extensive and perfectly legitimate public relations work to change the atmosphere of public sentiment in which the railroad business is conducted and in which the railroad problem is discussed. There are many persons in the railroad business who are skeptical about the value of public relations work. They live in terror lest the railways may be criticized for carrying on what has come to be stigmatized by the odious word "propaganda." It may be that it is impossible to create an intelligent and friendly public sentiment regarding the railways. If that is the case, then it follows that private ownership and management in this country is doomed. Nothing could be more certain than that unless a great effort to create a more healthy public sentiment is made that sentiment will not be created. Since unless such a sentiment is created it is a foregone conclusion that private ownership is doomed, there is to my mind no escape from the conclusion that the railway managements should see that more intelligent and comprehensive public relations work is done. It is just as vital to the future of the railways that this be done as that the properties be developed and operated efficiently.

Why is it that after so many years of struggle over government regulation of railways it is still necessary frankly to recognize the fact that public sentiment regarding railway matters is not what it ought to be? You have all heard the old story of the Arkansas man, the roof of whose house long needed repairing, but who never repaired it. He did not repair it when it was raining because he couldn't, and he did not repair it when it was not raining because he didn't need to. A very large part of our railway executives have assumed a similar attitude toward public relations work. When earnings have been bad they have considered that they could not afford to do it, and when earnings have been good they have considered it unnecessary.

In view of past experience, if it is true that we have reached or are approaching a pause in the storm, it is probable we are entering a period of danger to the railways. The only time that most railway managers have recognized the need for extensive and effective public relations work has been in periods of emergency when they have been engaged in great struggles with shippers over rates, or with labor over wages, or with unfriendly public men over legislation. It is in those periods, however, that public relations work is likely to be the least effective, because in those periods there already prevails a spirit of antagonism on the part of employees, or of shippers, or of public men which it is extremely difficult to allay. The best time to do effective public relations work is in the periods of calm when no large parts of the public are up in arms against the railways and when people are more disposed to listen to reason.

"In time of peace prepare for war." The periods when no great contentions or struggles are going on are the best times to present to the public the facts about the great increases in the safety and economy of operation which are being secured, the relative lowness of our railway capitalization and rates, and what the railways need to enable them to provide the public with the service that will be required in future months and years.

Valuation—Recapture—Depreciation Reserves

By Col. W. A. Colston

Vice-President and General Counsel, New York, Chicago & St. Louis Ry. Co.

Good times are coming on. Heretofore we haven't realized that there is such a thing as excess earnings, but some of us are coming along pretty close to the line now, some of us have passed it, and we have got to see that in this respect we will do fairness to the government and see that there is fairness done to the railroads. We must look to it that we play the game according to the rules of the game, and those rules should be announced before the game is started.

Prior to 1907 or thereabouts we could charge what we wished to, within reason, to operating expenses for improvements. There was no thought of depreciation.

After 1907 we began to have refinements in accounting, and we were required to charge depreciation on equipment, and we were permitted to charge it or not charge it on way and structures. So far as I know, there is only one large railroad in the country that did charge depreciation to any substantial degree on way and structures. You were permitted to charge or not charge in accordance with your judgment. Why? Accounting to be of any value must afford a true exhibit of the facts of the company's business. It is not a mere question of putting down columns of figures and making stereotyped statistical reports. The purpose of keeping accounts is to show the condition of the company's business, and so that the people who are responsible for managing that business may know how to proceed. Nobody knew then, and nobody knows now, any generally applicable rule for depreciation of way and structures, and the commission very sensibly left it to the judgment of the roads. In other words, the rule was that each road should determine for itself the facts and should account upon the facts so determined. Now, the railroads having been given that as the rule and having adopted that as the method and having said, as the roads of the country generally have said, "there is no depreciation of way and structures"; that, I submit, should be accepted as a fact. However much some of us may disagree with the majority or with individual roads in that respect, the convention has been established. However willingly we may all admit that as to the individual item, the separate rail, the separate tie, the separate bridge, or the separate other structure, there is depreciation, yet the consensus of opinion of the railroad accountants and engineers of this country is that combining appreciation and depreciation, taking the whole road as a complete tool, or working machine, there is no net depreciation of way and structures. Consequently, you have charged nothing to operating expenses for such depreciation. You have lived up to the rule and when you have had your rate investigations, when you have paid your taxes, when you have had all the troubles that the railroad man has, you have not fallen back on the defense that you had to make good depreciation of way and structures, or that the government or the people of the country had to pay for it.

Recapture

We had a valuation act. We had no misgivings. Nobody knew what the valuation act would amount to. We went along swimmingly. Then came the transportation act, which says that there shall be a recapture of earnings and that the recapture of earnings under Section 15a of the Interstate Commerce Act shall be based upon the value of property devoted to the transportation service, and that when the

values required to be found under Section 19a, or the valuation act, shall have been determined, those values shall be taken as the values upon which recapture shall be based.

Now, what is the situation? You have come along with, say, a $100,000,000 property. Omitting equipment, your way and structures cost and stand on your books at $100,000,000. You have not charged any depreciation on this account. You have not collected anything from the public for such depreciation. Your franchises have been computed and your taxes have been paid without any allowance for such depreciation. Your rates in the past have been fixed; your rates for the future under Section 15a have been fixed; your reductions in charges as recommended by the commission have been made; your reparations have been paid; all without any allowance for depreciation of way and structures, but when the time comes to value the property, you receive an engineer's report which says, "The cost of reproducing this property is $100,000,000, just as its investment shows, but we find its condition is only 80 per cent of its cost new, and therefore we take 20 per cent off for depreciation, and you get $80,000,000 as your value." Now, if you are allowed before recapture only 6 per cent on that cost of reproduction less depreciation, you are allowed before recapture only $4,800,000, and if you actually earn $6,000,000, or 6 per cent, on your real investment of $100,000,000, you have to split $1,200,000 up with Uncle Sam and give him $600,000, although you have not collected anything from anybody for this used-up value of property devoted to the public service, and your accounting, with the approval of public authority, has been based upon a determination that such shrinkage of value, or depreciation, does not exist.

I think this little illustration will emphasize the necessity for our making an earnest effort to harmonize and co-ordinate the accounting practices under the accounting rules of the Commission, and the engineering practices under the valuation act. I think we may expect the full and fair co-operation of all of the bureaus of the Commission in such an effort at harmonious adjustment.

The Rules of the Game

Now, I don't say whether it is better to charge depreciation or not to charge depreciation. I am not bringing that into the question. But, I say, let us get the rules of the game at the start and play it throughout one way or the other way, and don't let us work both ends against the middle. If we are to continue our old methods and are not to charge income for depreciation of way and structures, then obviously we must treat such depreciation as non-existent in determining valuations or capital accounts. If, on the other hand, we are now to admit depreciation in way and structures for valuations or capital accounts we must recognize that our income accounts have been overstated in the past and just as we raise reserves to cover overcharges and loss and damage, failure to acknowledge which has occasioned over-statement of income in the past, so should we now raise reserves by periodical charges to income until we have provided for that depreciation which was, but was not admitted, as well as for that depreciation which evermore shall be.

The Opportunities of the Auditor

By S. Ennes
Vice-President and General Manager, Wheeling & Lake Erie

For years we operating men have, in some degree, charged a large part of our trouble to inadequate rates, adverse legislation, labor unions, government control, but a man now on the Supreme Bench is reported to have said a great many years ago that a million dollars was wasted every day on the railroads of the United States. As I grow older, I am less inclined to take issue with him.

Many here represent roads with a gross business in excess of $100,000,000 a year, and some of you represent roads with a much larger gross income. Most of your roads are spending for operation 75 cents out of every dollar taken in over the counter. As we say, your operating ratio is 75 per cent or greater. Now one per cent of $100,000,000 is $1,000,000; and if the operating ratio can be reduced one per cent, the latter amount can be left in the treasury at the end of the year, and $1,000,000 is a lot of money, particularly when available at the end of the year.

Who is there about a railroad that has a better opportunity to find leaks, both of outgo and income, than the man who, from day to day, is recording the income and the outgo? Who has a better opportunity to know when the revenue for handling a car is too small, or the expense of handling too great, than the auditor? And who can question that it is not only his duty and responsibility but his opportunity to bring to the attention of his executives the costly irregularity?

It is possible, and I regard it as the auditor's duty, to make these important figures impressive and striking and to make them show up like the tail light on an overland passenger train, and it can be done. For example, not long ago we found we were handling some carloads approximately 50 miles for $3. When that was brought to the attention of the traffic manager, he at least promised himself that he would not get caught in that way again. Again, a year ago, we found it was costing us $10 every time we put an engine over the turntable. It has now been cut to five, largely by analyzing the costs which showed where reductions could be made.

Comparison affords the auditor an opening to introduce information regarding irregularities that will receive attention even if it is not always sympathetic. Give this a trial. When you get back home, some of you take your major accounts, and also the principal accounts that go to make up these major accounts, and compare them with neighboring roads of the same general characteristics, and I warrant you that you will find some very happy and some equally disappointing situations. For example, after comparing maintenance and transportation expense as a whole, see how your track laying and surfacing, account No. 220, compares in cost per mile and per 1,000 gross ton miles, with your neighbor's. In your maintenance of equipment see how your repairs to steam locomotives, account No. 308, compare. On this account there are three ways of comparison, one being per engine mile, another per 1,000 gross ton miles, and another for 100 tons of tractive effort. Also see how the amount your railroad is spending on repairs per freight car, account No. 314, compares with your neighbor's.

In transportation, yard service usually carries the leaks, and it is well to compare accounts 377 to 382, inclusive, and, with the results obtained, I want to again say that unless the road you are connected with is an unusual one, you will develop some figures that will get very earnest attention.

Now that you have developed the leaks, the question is how to stop them, how to correct the irregularity, and, in my judgment, the remedy is simple—expose it; advertise it.

Begin by tabulating costs down to the last cent and setting up one unit against another, and it has been my experience, based on a number of trials, that just the minute you begin to do this, you begin to get satisfying results. You have all of this information in your offices, and in actual practice you will find the cost of assembling it in a manner necessary to get results very much less than expected. As stated before, we cut our cost of handling engines in two in less than a year, and it was done by separating the expenses in accordance with I. C. C. classification, and showing the man in charge of each unit not only what it was costing him for washing boilers, cleaning fires, coaling engines, etc., but the number of men he was using on each job, and alongside of it we placed the figures of what was being done at other engine terminals—with the result they all got busy and the cost came down, and I never have known it to fail.

General News Department

The Sunshine Special of the Texas & Pacific was derailed nine miles east of Mineola, Tex., on June 14, and two coaches fell down a bank and were overturned. Eighteen passengers were reported injured.

Passenger Train No. 4 of the Louisville & Nashville was derailed at a switch near Flomaton, Ala., on June 15, and the engine and first three cars were overturned. The wreck fell against a warehouse at the side of the railroad and two workmen therein were killed. A number of passengers were injured.

Citizens of Palestine, Tex., are agitated over the expected removal of the International & Great Northern's shops from that city, and several heated conferences have been held between citizens and officers of the city, the citizens being determined to contest the contemplated removal. In behalf of bondholders a suit has been filed in the federal district court against the city of Palestine and the citizens, to enjoin them from interfering with the road's removal plans.

A train robbery which was committed near Webster, Pa., on the Pittsburgh & Lake Erie, last Saturday, was begun and finished, and the robbers escaped, all within about five minutes. It was on the Fairmont express about 10 a. m. After passing Monessen, two men passed from the smoking car to the baggage car, putting on masks as they went, and, intimidating the baggageman and the express messenger with pistols, they gagged them, took the messenger's keys and rifled the safe. When the train stopped at Webster, the robbers jumped off and entered a waiting automobile. The station agent, finding the baggage car door closed, went in and found that the baggageman had just succeeded in freeing himself.

O. C. Fairfield, a former flagman of the Atlanta, Birmingham & Atlantic, one of the employees who went out on strike in March, 1921, has been convicted of bridge burning, in a Georgia court, and sentenced to imprisonment for life. Under the law of Georgia, burning a railroad bridge is a capital offense; and the solicitor general, in the trial of Fairfield, asked that the accused be hanged; but the jury had added to its verdict of guilty a recommendation for mercy. Fairfield was one of five men charged with burning a bridge near Musselwhite, Crisp County, Georgia, on May 30, 1921. Fairfield is, we believe, also one of those who were indicted on a charge of murder in connection with a derailment at Fitzgerald, Ga., in July, 1921, when the engineman of the train was killed in the wreck.

Radio on Shriners Excursion Train

Radio messages were lately received on an excursion train of the Southern Pacific (while it was moving at regular speed) from distances of 2,000 to 3,000 miles, according to a statement issued by that company; and it was in the day time. The train was a special carrying the Syrian Temple of Shriners from Cincinnati over the Southern Pacific. Receiving record of 2,000 miles for radiophone was established, and a 3,000 mile record for telegraph reception. Aerials were strung 8 inches above the roof of one of the cars and were 160 ft. in total length. A rail ground was used. The receiving equipment included honeycomb coils and a two-step-audio-frequency amplifier. The train left Cincinnati in radio touch with both coasts. At Denver, music programs were copied from the radio stations at Pittsburg and Chicago. At Colorado Springs the Cincinnati station was heard. The long distance record was made at Santa Barbara when the radio, while the train was in motion, picked up the United States Government station NSS at Annapolis, 3,000 miles away. This is claimed to be a record for daylight reception under any conditions.

For Safety at Crossings

The highway commission of Indiana is preparing to issue an order requiring that all advertising signs shall be removed (by the owners) from the right-of-way of the State Highway Commission and that no signs of any kind shall be erected on the public highways without the permission of the highway commission. It is anticipated that this order will eliminate much of the confusion with warning signs at railroad crossings. The state authorities of Illinois have already taken similar action.

No Dust on the Long Island

The Long Island Railroad is now oiling its roadbed, a special train having been assigned to that work for the next four weeks. C. D. Baker, general superintendent, announces that the oiling program for 1922 will be the most extensive ever carried out by the company. In 1921 they used 30,000 gallons of oil; this year 150,000 gallons. Last year about $2,200 was spent for oil and labor; this year about $10,000. The oil tank car holds about 8,000 gallons and the perforated pipes extending from each side extend out about three feet.

C. F. Loweth Leads in A. S. C. E. Nominations

In the first ballot for official nominees of the American Society of Civil Engineers, C. F. Loweth, chief engineer of the Chicago, Milwaukee & St. Paul, received 1,423 votes for president out of a total of 2,309 cast. Among the candidates for vice-president in zone 2 is S. T. Wagner, chief engineer of the Philadelphia & Reading, and in zone 3, F. G. Jonah, chief engineer of the St. Louis-San Francisco. Among the candidates for directors are J. E. Crawford, chief engineer of the Norfolk & Western (District 5); H. W. Hudson, chief engineer of the Interstate Railroad (District 5); H. A. Lane, chief engineer of the Baltimore & Ohio Lines East (District 5); A. S. Baldwin, vice-president of the Illinois Central (District 8) and R. N. Begien, general manager of the Baltimore & Ohio (District 9).

To Form New Hardwood Association

Organization of a national hardwood lumber association to create an inspection service, form a statistical bureau and carry on trade extension work will be effected at a meeting of hardwood manufacturers at Louisville, Ky., now in session. The purposes of the new association are outlined as follows:

1. To have inspection rules and service in conformity with the ideas expressed by Secretary of Commerce Hoover, setting up technical and engineering service to co-operate with the National Lumber Manufacturer's Association.
2. To establish a statistical bureau providing such information as may be of benefit to the industry and within the legal rights of association activities.
3. To carry on such trade extension work as may be deemed wise by the convention to promulgate.

M. & N. A. To Begin Passenger Service

The Missouri & North Arkansas restored through passenger service between Neosho, Mo., and Kensett, Ark., on June 18. A mixed train had been operating daily between those points since the first of June, but, there has been a large increase in freight traffic, and a separation of the freight and passenger service was deemed necessary. Following a meeting of the Boone County Protective League, held in Harrison, Ark., on June 6, many Harrison business houses placed signs in their shop windows stating: "We are for open shop; show your card." The meeting and the decision to place business houses on record for or against the open shop idea is the result of increasing bitterness between striking railroad men and their sympathizers and the residents

of Harrison, who blame the unions for much of the trouble which caused a nine months' suspension of operations of the road. Officers of the Protective League declare that not only do the majority of the residents of Harrison favor the open shop plan of operating the road, but that the farmers generally are incensed at tactics adopted by union labor to prevent operation of that territory's only railroad. Another meeting was held on June 17, at which there was a large attendance of farmers. The Protective League is seeking through these meetings and other methods to defeat the strikers through the pressure of public opinion.

New England Governors' Committees

The commission which has been appointed by the Governor of Connecticut to represent the state at Washington in connection with the proposal to favor the organization of a consolidated railroad company for all New England, consists of E. Kent Hubbard, chairman; E. O. Goss; C. G. Woodward; F. L. Ford; D. S. Day and S. H. Bullard.

The Governor of Massachusetts has appointed a similar committee. It is said that the six New England states are planning to establish a combined committee. The Massachusetts committee consists of James J. Storrow; A. W. Gilbert, F. H. Willard, Philip Dexter and Carl Dreyfus.

The Governor of Rhode Island has appointed a committee of five members, namely, G. L. Crooker, E. E. Salisbury, William Trafton, H. W. Fitz and W. F. Morse.

Pennsylvania Women's Aid

The Women's Aid of the Pennsylvania Railroad System is conducting a campaign to increase its membership among the families of the 17,000 employees in the Northwestern Region. The Women's Aid was described in the *Railway Age* of April 15 last. It aims to organize the women of the families connected with the Pennsylvania System in order that they may know one another and, when occasion arises, render aid and sympathy in such manner as may be most helpful. It has already more than 50,000 members. The wives, mothers, sisters and daughters of Pennsylvania employees and all women employees are eligible for membership. The dues are uniformly 25 cents a year. The badge is a small pin inscribed "P. S. Women's Aid." Mrs. W. W. Atterbury is director of the Aid for the System, and Mrs. J. G. Rodgers is associate director for the Northwestern Region. The six operating divisions in the Northwestern Region have been organized under the following superintendents: Chicago Terminal, Mrs. W. H. Scriven; Fort Wayne, Mrs. T. A. Roberts; Logansport, Mrs. B. H. Hudson; Toledo, Mrs. J. B. Hutchinson, Jr.; Grand Rapids, Miss Hilda Jones; Mackinaw, Mrs. R. E. Casey.

The Pennsylvania Railroad's Insurance Fund

The Pennsylvania Railroad began to insure its own property against loss by fire, in a small way, over 40 years ago—in 1879. From time to time the plan has been expanded until it now includes the assumption of marine losses, payments on account of injuries to persons and damage to freight and other insurable risks and losses. The average fire loss cost on the Pennsylvania System during 43 years has been only 14 cents per $100 at risk. As the result of the development of systematic inspections the cost of the road's fire protection has been substantially less than the premiums generally charged by insurance companies for railroad risks. In addition the unknown element is eliminated from the cost of operation. The properties are regularly inspected by the Insurance Department and reports are forwarded to the operating officers interested. Plans for fire protection and contracts for the construction of structures and vessels are referred to the Insurance Department so that the most suitable type of fire protection may be recommended. The excellent fire fighting record of the road is attributed principally to the installation of adequate fire equipment and the maintenance of fire brigades regularly drilled at all points where the valuations warrant and sufficient employees are available to form a fire brigade. There are approximately 400 fire brigades organized on the Pennsylvania System.

B. L. E. Buys Coal Lands

The Brotherhood of Locomotive Engineers has entered the wholesale and retail coal business, according to a statement by Albert F. Coyle, editor of the Brotherhood of Locomotive Engineers' Journal. "The locomotive engineers are making a $2,000,000 investment in the West Virginia and Kentucky coal mines," said Mr. Coyle; and he promises a "fair deal for the miners, and better and cheaper coal for the consuming public." The purchase covers more than 6,000 acres of "the best coal land in the United States," situated on the Coal river, in Boone County, West Virginia, and in Floyd county, the heart of the Big Sandy coal district, near Prestonburg, Ky. The Coal river Collieries is the name of the new company. Locomotive engineers throughout the country have subscribed in small amounts to the capital stock of $2,000,000. It is planned to establish retail yards in the large cities. Locomotive engineers and their friends have already organized some of these local yards in Ohio and Michigan.

Coal Car Distribution to be Investigated

The Interstate Commerce Commission has instituted an investigation into the matter of the justness, reasonableness and lawfulness of the rules and practices governing the distribution of cars to coal mines, other than anthracite, for coal loadings, and as to the ratings for such mines as the basis for the distribution of cars. A just and reasonable basis of mine ratings will tend to make effective a just and reasonable distribution of cars to coal mines. The Car Service Division of the American Railway Association, after collaboration with the important bituminous coal loading railroads and the National Coal Association, has submitted to the commission a proposed revision of the rules now incorporated in what is known as Circular CS 31 (revised). A copy of the rules as proposed was attached to the commission's announcement, marked exhibits A and B. Exhibit A shows the changes proposed in the uniform rating and car distribution rules governing tipple mines. Exhibit B shows suggested rules governing the rating of and car distribution to other than tipple mines. While representatives of the National Coal Association do not agree in every instance that the rules proposed embody all that they might desire, they join with the Car Service Division in recommending the revision for early promulgation, except as to Rule 8.

The initial hearing will be at Washington on July 17.

Nearly Eleven Million Tons of Coal in Stock

The American Railway Association has just issued a report showing that all railroads in the United States had on June 1 in stock piles or in cars 10,847,000 tons of bituminous coal. The average daily consumption of coal for the month of May was about 284,000 tons, of which 145,000 tons a day, on average, was being taken from stock on hand.

Based upon the total average daily consumption, including the product of operating mines, the railroad's position showed that they had on hand on the first of May, 94 days' supply and a month later, 75 days' supply, on the average.

The following statements showing the information as to the railroads as a whole are self-explanatory:

Month	Total Consumption	Consumed from Current Coal Received	Consumed from Stock
April	8,350,000	3,550,000	4,800,000
May	8,520,000	4,320,000	4,200,000

Day	Stocks on Hand	Total Daily Average Consumption	Daily Average Consumption from Stock	Day's Supply on Hand (*)
April 1	19,843,833	271,000	.....	.....
May 1	15,052,268	278,000	160,000	94
June 1	10,846,567	284,000	145,000	75

(*) Based only upon that portion being actually taken from stock piles at the rate established during April and May, respectively.

Rock Island Anniversary Program Announced

The Chicago, Rock Island & Pacific has announced plans for the celebration of its 70th anniversary on October 10. Employees on all divisions will co-operate to make the observance a success. A general program has been prepared which will be supplemented later by features to be developed by employees on the various

divisions. The general program, as agreed upon by the executive officers at a staff meeting held recently in Chicago, is as follows: (1) Co-operation by the Rock Island Employees' Clubs to the end that meetings be held by these organizations on the evening of October 10, at which time programs will be rendered appropriate to the anniversary and in accordance with the desires of the individual clubs. (2) An address to be delivered by President Gorman at the radiophone studio of the Westinghouse company, K Y W Chicago on the evening of October 10. Each employees' club throughout the system will be asked to equip with a radiophone receiving set so that the address can be heard by all those attending these club meetings. (3) At points where there are no employees' clubs, the local commercial clubs or chambers of commerce will be asked to co-operate and hold meetings at which a representative of the Rock Island will attend to deliver a special message. Commercial clubs will also be asked to provide themselves with radiophone receiving instruments. (4) The Rock Island is to issue a special historical booklet for general distribution.

The Rock Island Magazine will issue a special Seventieth Anniversary number. (5) The planting at various suitable points on the system of anniversary trees as a means of further beautifying company property and station grounds. Similar planting of "honor trees" to retired employes was also suggested. (6) Special menu cards to be issued on all Rock Island dining cars on October 10. (7) The suitable decoration of all passenger engines on the system, likewise passenger stations. It is proposed to adopt a uniform Seventieth Anniversary design which design will be used on buttons to be issued to all employees. (8) The installation of a permanent historical exhibit of the Rock Island in the La Salle Station (Chicago) waiting room. (9) The launching of a campaign before October 10 for a general "cleaning up" working up to Anniversary Day, the campaign to include painting of buildings. (10) A dinner to be given by the management to all pensioners.

Automobile Wrecks

Eastbound passenger train No. 804, of the Pennsylvania Railroad, was derailed near Allaire, N. J., on June 16, by striking an automobile which had been stalled on a crossing. The locomotive and two cars were ditched and the locomotive was overturned. It had run about 500 ft. beyond the crossing before it tipped over, the wrecked automobile being pushed that distance when a switch was encountered.

The engineman and fireman were not injured. Seven passengers were injured, none seriously. Of the two persons in the automobile, one, the driver, was killed.

A track walker was an eye witness. The day previous he had noted a narrow escape at the same crossing and was on the alert for something similar. He saw Train 804 approaching and at the same time observed the automobile approaching the crossing at 15 or 20 miles an hour. He stepped out into the road and held out his hand as a warning but the automobile continued on to the crossing and finally stopped with the rear wheels between the rails, evidently stalled.

The regulation whistle signal was blown for this crossing and the crossing bell was ringing. There is a plain view of an approaching train on the roadway 138 ft. from the crossing for a distance up the track of 1,300 ft.

The automobile was driven by a West Point cadet who was not authorized to operate an automobile under the laws of the State of New Jersey. He was accompanied by a young lady, 17 years old, who also was without a license to drive an automobile in New Jersey. It is said that the brakes of the automobile would not work.

The damage to locomotive, cars and track amounted to about $6,000.

The investigation of the automobile disaster near Atlantic City, N. J., on June 10, reported in the *Railway Age* of June 17, page 1497, developed the fact that the engineman of the train did not know that there had been any trouble at the crossing; and the conclusion is that the automobile must have struck the locomotive on the side. The driver of the automobile, with the five members of his family accompanying him, were all killed.

New York City papers of Monday morning, June 19, reported accidents causing the deaths of 14 persons at grade crossings; five at Carman, N. Y.; four at Peabody, Mass., and five at Royal Center, Ind.

Traffic News

The Philadelphia & Reading has increased its train service to Atlantic City and now runs each week day between that city and Philadelphia 18 expresses each way; besides regular daily excursion trains on which the fare is $1.50.

Freight rates are to be reduced in Indiana on July 1, to correspond with the reductions which are to be made in interstate rates. On coal for distances of less than 30 miles, and on cement, the rates, it is understood, will not be changed.

The Chicago & North Western re-established its Northern Lakes Special on June 16. This train leaves Chicago every evening except Sunday at 7:00 for northern Wisconsin and Michigan. It carries passengers to the fishing districts of Manitowish, Cisco, Eagle and Turtle.

The Southern Pacific announces reductions in the freight rates on cotton by steamship from Galveston and other Gulf ports to New York, Boston and other points, to take effect on July 1. To New York the reduction is from 50 cents per 100 lb. to 35 cents; to Fall River and New Bedford the present rate is 88.5 cents; new rate 55.5 cents.

The National Automobile Chamber of Commerce reports that in the month of May manufacturers shipped 252,000 automobile passenger cars and trucks, an increase of 53 per cent over May of last year. There is increasing demand for motors in practically every part of the country except Maine and Georgia. In April the exports of passenger cars and trucks gained more than 40 per cent over March. These cars went to 114 different countries.

The Southern Pacific's carloading record for 1921, with an average load of 26.2 tons per car, was the best in the history of that company. Prior to last year, the best carloading record was made in 1918 when the railroad administration was in a position to deal more or less arbitrarily with patrons who were not inclined to load cars heavily, the average load for that year being 25.6 tons. For the first four months of this year the average car load has been 26.5 tons as compared with 24.7 tons last year.

W. H. Quigg, traffic assistant, in the office of the United States Railroad Administration, Washington, has been assigned to duty with the Federal Traffic Board, in a similar capacity. This Board deals with the traffic problems of the different departments and establishments of the United States Government, co-ordinating their relations with the carriers. Mr. Quigg has served as a railroad traffic officer on lines in the southwest and southeast and in Eastern Trunk Line and Central Freight Association territories. He was a member of the Uniform Freight Classification Committee at Chicago for several years, and just prior to his connection with the United States Railroad Administration, was secretary of the traffic division of the American Railway Association.

Coal Production

Production of soft coal in the tenth week of the strike was 5,078,000 net tons, but the eleventh week (June 12-17) is expected to show a decrease, according to the Geological Survey. Production of anthracite remains practically zero.

Complete returns confirm the forecast of output in the tenth week of the strike (June 5-10). Including the 13,000 tons of anthracite dredged from the rivers, the total output of all coal was 5,091,000 tons. In the corresponding week of 1921, a year of acute business depression, production (including anthracite) was 9,974,000 tons. In the active year, 1920, it was 12,315,000 tons.

There has been little change during the week in the number of men on strike. The accumulation of unbilled loads is still declining. How great is the draft upon stocks can not be accurately stated, because the rate of consumption is not known. There are evidences that business is reviving and the consumption of coal increasing.

Commission and Court News

Interstate Commerce Commission

The commission has suspended to October 13 the operation of schedules which propose reductions in the rates on coffee from New Orleans, La., and sub-ports to points in Texas.

The commission has suspended until October 13 the operation of schedules contained in Northern Pacific tariffs which proposed to increase from 5 to 7 cents per gross ton present storage charges on iron ore at Lake Superior docks.

The commission has vacated its order requiring an increase in Florida intrastate freight rates, the Florida commission having vacated its order which allowed less of an increase in state rates than was applied to the interstate rates by the federal commission.

The commission has suspended until October 13 the operation of schedules which propose to establish import commodity rates on paper stock from New York and other North Atlantic ports to points in Central Freight Association territory which are higher than present domestic rates.

The commission has suspended from June 21 until October 19 the operation of schedules which propose to increase commodity rates on butter in straight carloads, and on butter, eggs and dressed poultry in mixed carloads, from points in Texas to various eastern and northern destinations.

The commission has suspended until October 13 the operation of schedules published by the Chicago, Milwaukee & St. Paul, which propose to reduce the rates on hogs from Mitchell, S. D., to Kansas City, Mo., St. Joseph, Mo., Atchison, Kans., and Leavenworth, Kans., from 52 cents per 100 lb. to 47½ cents.

The commission has suspended until October 17 the operation of schedules which propose to modify existing regulations in connection with proportional rates on grain between the Twin Cities and Lake Superior Ports by removing the requirements for surrendering inbound billing as a condition precedent to application of proportional rates.

Ore Rates to Upper Lake Ports to Be Reduced

The commission has issued a supplemental report in the general rate case in which it finds that the rates on iron ore from ranges in Minnesota, Wisconsin and Michigan to Lake Superior and upper Lake Michigan ports will be unjust and unreasonable after July 1 to the extent that they exceed 90 per cent of the existing rates, thereby including them in the general 10 per cent reduction. These rates were not advancd in Ex Parte 74 because they had been advanced by the director general in 1918 without corresponding advances in the rates from the lower lake ports. Since August 26, 1920, none of the rates on iron ore to upper lake ports have been reduced, while some have been increased. All are still on or higher than the level found reasonable in Ex Parte 74. Commissioner Hall dissented from the finding.

Southern Freight Rates Investigation

Commissioner Joseph B. Eastman has announced the dates for future hearings in the above-entitled proceeding as follows: Atlanta, beginning September 14, to September 23; Asheville, October 2, to October 21; New Orleans, October 23, to November 4; Chicago, November 6, to November 18; New York, beginning November 20. The hearings at Atlanta, Asheville, and New Orleans will be confined to the presentation of evidence with respect to rates applying within southern classification territory, and the hearings at Chicago and New York will be confined to the presentation of evidence with respect to interterritorial rates. There are two exceptions to this program. It appears that the rates between St. Louis and points within southern territory are closely allied with the rates in southern territory, and have been included in that category in the presentation of the carriers' evidence. So the rates to and from St. Louis will be covered at the hearings at Atlanta, Asheville, or New Orleans. The same is true as to any evidence that may be offered with respect to the rates from the group including Portsmouth, Ohio, Ironton, Ohio, Ashland, Kenova and Huntington, W. Va., which are closely allied with the rates within southern classification territory.

Federal Valley Case

The application of the Federal Valley for increase of its divisions has been denied by the Interstate Commerce Commission on the ground that the record fails to show that the divisions are unjust, unreasonable, inequitable or otherwise unlawful. The commission says: "The record is not sufficient to enable us to compare the amount and cost of the service rendered in the joint traffic by the complainant and by the defendant respectively, to say nothing of other participating carriers; nor can we determine whether or not an increase in the Federal Valley's divisions would compel the defendant to carry the traffic at less than the actual out-of-pocket cost. The information which has been furnished does not, in short, make possible adequate consideration of the various factors which Paragraph (6) of Section 15 of the Interstate Commerce Act requires us to consider in fixing divisions."

Chairman McChord filed a dissenting opinion, in which he declares: "The situation of this road as shown in the majority report is one which calls for remedial action upon our part in the exercise of our comprehensive power to prescribe just, reasonable, and equitable divisions. * * * We have power under Paragraph (6) of Section 15 of the Interstate Commerce Act to make at least a temporary adjustment in the divisions of the joint rates so as to make the compensation allowed the Federal Valley more nearly equal to the cost of rendering the service."

State Commissions

The Corporation Commission of Virginia has ordered a general reduction of freight rates, July 1, to correspond with the reductions to be made on that date in interstate rates.

The Railroad Commission of Georgia has issued an order authorizing a general reduction of 10 per cent in intrastate freight rates to correspond with the reduction which has been ordered in interstate rates, to go into effect on July 1.

The Louisiana Public Service Commission has issued an order, order No. 48, dated June 15, calling for a general reduction of freight rates on July 1, corresponding to the reduction taking effect on that day in interstate rates. The order contains exceptions to allow for cases where rates have already been reduced.

The Public Service Commission of Alabama has sent a notice to each of the railroads in the state calling their attention to the law, passed in 1919, requiring the windows of all passenger trains to be fitted with screens. Complaints have been received that some railroads never have complied with the law.

The Public Service Commission of New York has authorized a general reduction of 10 per cent in freight rates on July 1, but the order does not apply to grain and certain articles which already are carried at rates lower than the proposed basis. On iron ore, gravel, and certain other articles, no reduction is to be made as the rates on these were not advanced in August, 1920. The reduction now ordered will not include the minimum charge of fifty cents per shipment for less than carload traffic; the minimum charge of $15 on carload traffic; the minimum scale for class rates when published as such; the charges for special service other than those for switching, transit, reconsignment, etc.

The California Railroad Commission has invited the public utility commissions of Oregon, Washington, Nevada, Utah, Arizona, New Mexico and Texas to a conference to be held in San Francisco on June 19, to discuss possible joint action by these states with reference to the separation of the Southern

Pacific and Central Pacific railroads as was ordered by the United States Supreme Court in its recent decision. It is expected that this conference will also consider whether an appeal should be made to the Interstate Commerce Commission, to exercise the powers conferred upon it by the Transportation Act of 1920, for the consolidation of the railroads of the country into regional systems.

United States Supreme Court

Service Letter Laws Upheld

The Supreme Court of the United States holds valid and not in violation of the Fourteenth Amendment, the Service Letter Law of Oklahoma, of April 24, 1908, applicable to public service corporations and the like, in a case in which the plaintiff, a switchman on the Rock Island, averred that he had received personal injuries; the railroad acknowledged liability, settled with him on the basis of its responsibility, furnished him with hospital treatment, and then refused to re-employ him on the ground of physical incapacity; that, two years afterwards the road gave him a service letter certifying (correctly) that he had been employed as switchman for a period named, and (contrary to the fact) that he had been dismissed on account of his responsibility in a case of personal injury to himself June 30, 1913, his service being otherwise satisfactory. Plaintiff also averred that because of this letter he had been unable to secure employment although competent, able and willing. The railroad, besides a general denial, averred that the statute upon which the action was based was void because it deprived defendant of the due process of law and denied to it the equal protection of the laws; and also because it violated a section of the state Constitution in denying to defendant freedom of speech, including the right to remain silent. A trial by jury resulted in a verdict and judgment for plaintiff, which on appeal was affirmed by the State Supreme Court (Dickinson v. Perry, 75 Okla., 25).

The United States Supreme Court sustained the statute as not inconsistent with the guaranty of "due process of law." Except for the particular requirements contained in the proviso, the Oklahoma Service Letter Law does not differ substantially from the Missouri statute sustained in the Cheek case. "The right to conduct business in the form of a corporation, and as such to enter into relations of employment with individuals, is not a natural or fundamental right. It is a creature of the law; and a State in authorizing corporations to carry on business and employ men may qualify the privilege by imposing reasonable conditions. . . ."

The proviso in the Oklahoma statute requires that the service letter shall be written entirely upon a plain sheet of white paper to be selected by the employee and no printed blank to be used; with other details. On this point the Supreme Court says: "Manifestly these provisions are designed to insure the authenticity of the document and to make sure that it shall not only be fair and plain upon its face but shall exclude any cryptic meaning. They are contrived to prevent the purpose of the act from being set at naught by fraudulent service letters, which while bearing one meaning to the employee might bear another and very different one to the prospective employer to whom they might be presented. The act being valid in its main purpose, these provisions intended to carry it into effect must be sustained."

The opinion concludes: "The contention that the Service Letter Law denies to plaintiff the equal protection of the laws is rested upon the fact that it is made to apply to public service corporations to the exclusion of others, but it may have been that the public had a greater interest in the personnel of the public service corporations, or that the legislature deemed it expedient to begin with them as an experiment. It was peculiarly a matter for the legislature to decide, and we feel safe in relying upon the general presumption that they 'knew what they were about.'"—C. R. I. & P. v. Perry. Decided June 5, 1922. Opinion in this and Prudential Ins. Co. v. Cheek, both by Justice Pitney. In both cases the Chief Justice, with Justices Van Devanter and McReynolds dissented, but without separate opinion.

Other states having somewhat similar statutes are Indiana, Montana, Nebraska and Texas.

Foreign Railway News

Columbian Executive Comes to U. S. to Buy Equipment

General Vassauez Cobo, president of the Pacific & Atlantic Railroad of Columbia, which is now in course of construction, has arrived in New York with the announced intention of purchasing some $2,500,000 in equipment for his company.

Revenue from Platform Tickets

LONDON.

The Midland Railway of England at about 30 of its largest stations will not allow anyone without a ticket to go on the platforms. People who are not passengers and wish to get on to the platforms must purchase "platform tickets", the cost of which is one penny (approximately 2 cents at the normal rate of exchange). During last year the income earned from this source amounted to £6,708 (about $32,600 at the normal rate of exchange).

Argentina Buys German Locomotives

The Argentine State Railways have ordered 50 locomotives from Germany, according to the Wall Street Journal. The Argentine Port Zones Authority has, according to the same publication, opened bids for 130 cars and 10 locomotives. Ninety concerns in the United States, England, Germany and Belgium bid on this business and, since the American bids were the lowest, it is thought that the contracts will come to this country.

Long Tunnel in New Zealand Nearly Finished

The Arthur's Pass Tunnel to facilitate communication between the east and west coasts of South Island, New Zealand, is nearing completion, according to the Times (London). Work on the tunnel was begun in 1908 but was seriously delayed by the failure of the original contractor to go through with the work. The tunnel will be electrified. Its dimensions are: Length, 5 mi. 545 yds.; height, 15 ft. 6 in.; width at rail, 14 ft., at widest point, 15 ft.; grade, 1 in 33. The approximate cost of the work is £800,000 and £382,000 for the electrification.

Large Expenditures for Rolling Stock Disapproved in Italy

ROME, Italy

With regard to the credit of 1,750 millions of lire granted with a decree of the Italian Council of Ministers to the Italian State Railway Administration for the purchase of rolling stock and other supplies it is now learned that the parliamentary committee for public works has not approved the above mentioned decree and that it has observed that at least one part of such material could be obtained from Germany on account of reparations.

It is known in this connection that it had been decided to grant such credit in order to aid industry, and that manufacturers are urging that the government refuse to accept from Germany machinery and manufactured products on account of reparations. Up until the present time Italy has received from Germany on the reparation's account only 50 locomotives.

Italian Railways Deficit

ROME, Italy

Mr. Riccio, Italian minister of public works, has submitted to parliament the budget for the Italian Railway Administration for the fiscal year 1922-1923 and took the opportunity to point out that during the first eight months of the present fiscal year the loss of the administration amounts to 709 millions of lire. He believes that such loss is not due to an increase of expenses but to a decrease of revenues during January and February, 1922.

"However," said Mr. Riccio in the speech delivered to the parliament, "There is no doubt that one of the causes of the

loss is also the inflated personnel which, with the hurried application of the law regarding the eight-hour day and compelling the employment of former soldiers, has reached 212,852 persons." He does not believe that the loss has any connection with the increased quantity of fuel used.

Other causes of the loss are, according to Mr. Riccio, the necessity of heavy repairs to locomotives and low rates. He pointed out that he does not believe in the right to strike in the public service and that he hopes strikes will be avoided.

The High Speed of British Passenger Trains

The announcement by a number of British railway companies of accelerations of train services to take effect next month directs attention to the subject of train speeds for which British railways have long held a high reputation, according to the Times (London).

The number of trains traveling at high speeds has undergone a material increase during recent years but the maximum speed attained by main line trains is little in excess of the best speeds recorded many years ago. It is the case, however, that the locomotives haul much heavier loads, which calls for the employment of much greater power. This in turn has raised the whole question of permissible weights on bridges, and has involved railway companies in considerable expenditure.

Excluding "slip-coach" (whereby a car is detached for a local station without stopping the train) records, the London & North Western heads the speed table for 1922 with the run between Birmingham and Coventry at an average speed of 60 miles per hour. The Great Western's achievement of running the 107 miles between Paddington Station, London, and Bath, where a slip-coach is detached, in one hour forty-five minutes, giving an average speed of 61 miles per hour, is in some respects a finer performance, and the same company has an excellent achievement standing to its credit in the two-hour train to Bristol via Box, which represents an average speed of 59.1 miles per hour. The two-hour trains to Birmingham on both the London & North Western and the Great Western, are slower by comparison, but the average speed of these trains (about 55 miles per hour) is greater than it was, as the run is now performed in two hours by both routes with an intermediate stop.

The Great Central occupies a high place among high-speed runs. The best trains of this company are those running in the London and Manchester service over a road which is very severe in comparison with those of the North Western and Great Western. The best average speed of the Great Central London and Manchester services is 50.29 miles per hour, and the highest scheduled speed attained by the same train is for the 58.75 miles between Quainton Road and Leicester, which is covered in 56 minutes, giving an average speed of 62.89 miles per hour. This is not, of course, a start-to-stop run, as the train does not stop at Quainton Road. The highest speed run on the Caledonian Railway is that from Forfar to Perth, 32.5 miles in 34 minutes; of the Midland Railway, Kettering to St. Pancras Station, London, 72 miles in 77 minutes, giving an average speed of 56.1 miles per hour; of the North Eastern Railway, York to Darlington, 44.25 miles in 48 minutes, which works out at 53.3 miles per hour; and of the Great Northern Railway, Grantham to Doncaster, 50 miles at an average of over 54 miles per hour. The best Great Northern long-distance trains are the Scottish express, London to York, 188 miles at an average speed of nearly 52 miles an hour, including one stop, and to Peterborough, including stops, 76 miles at an average speed of nearly 52 miles per hour. The fastest North British trains are those between Glasgow and Edinburgh with an average of 40 miles.

Nor do the Southern lines, in spite of the handicap in some instances of heavy gradients and speed restrictions on account of bridges, fall far short of the records set up by the trunk railways serving the Midlands and the North. The South Western Company has in service trains which cover the 108 miles from Waterloo to Bournemouth at an average speed of 54 miles an hour; the Brighton and London services, 51 miles in 60 minutes, are known to most people; and the boat trains of the South Eastern Company to Dover and Folkestone are, considering the character of the road, as good as can be expected. The Dover trains make the trip at an average speed of 45 miles per hour, which is not, however, quite so good as that of a limited train in the pre-war period, which had an average speed of 51 miles and ran to Dover in an hour and a half. The new train to Folkestone Harbor, which is coming into the time-table next month and will make the trip in one hour and thirty-five minutes, is almost as good, as the train has to stop and reverse at Folkestone Junction. This represents an average speed of 52.4 miles. The best performance of the Great Eastern Railway is the London and Cromer express, which makes the journey of 138 miles at a speed of 47.5 miles per hour.

Notable Irish train speeds are the Great Northern, Dublin to Dundalk, 51 miles per hour, and the Great Southern & Western 48.5 miles per hour.

The most famous of the long runs on British railways is that between Paddington Station, London, and Plymouth, a distance of 225.75 miles for which 247 minutes are allowed, giving an average speed of 54.8 miles per hour. Second place was formerly occupied by the non-stop Marylebone Station, London, to Sheffield Great Central train on a timing for 165 miles of 177 minutes, but there is apparently no immediate intention of reinstating this train. Second place is now held by the Euston Station, London to Crewe non-stop trains, which for 158 miles show an average speed of 53.5 miles per hour, this being followed by the North-Eastern, Newcastle to Edingburgh, 124.5 miles at 50.8 miles per hour.

It is improbable that anything beyond small improvements in average speed will be made by British main-line railways while steam operation remains the rule. For higher speeds it will be necessary to await the advent of electric traction on main lines. It is known that the Brighton Railway Company has plans well advanced for the conversion of its main line from steam to electric traction, and it has been suggested that when this reform is carried out it would be possible to run a service every fifteen minutes between London and Brighton and to make the trip by non-stop trains in 45 minutes. The fact has also been made public that a passenger locomotive is being built by the North-Eastern Railway Company, which will be designed for a maximum speed of 90 miles per hour.

The Significance of Oil to the Argentine Railways

BUENOS AIRES.

The Argentine government controls most of the petroleum measures in Patagonia in the costal region about Comodaro Rivadavia, as well as those in the North of the republic, in the province of Jujuy. The national petroleum administration works in close co-operation with the government railway administration and the latter itself has charge of the drilling in the northern fields. Excellent results have been obtained by the drilling at Morro Quemado (province of Jujuy) and at many other places in this province.

At the present time the State Railways are using about one million tons of wood per annum as fuel, which involves the felling of some three million trees annually. Most of the Argentine trees are hardwoods such as "quebracho," "algorrobo" and "ombu" which have a high heat value. Their use is hard on fireboxes and makes continual repairs necessary and, naturally, greatly increases operating expenses. Consequently the railway administration expects to effect considerable savings by the use of oil.

It is planned, however, to do away with wood fuel by degrees in order to allow the forest owners to adapt themselves to new conditions and locate other outlets for their product. It is estimated that the State Railways will need altgether about 250,000 cubic meters of petroleum per annum. They will, however, use but 60,000 cubic meters the first year, 120,000 the second and so on, so that four years will elapse before wood will be abandoned altogether.

The government is now building 620 miles of narrow gage railways in Patagonia and these will be extended as the region develops. Oil from Comodaro Rivadavia will be used as fuel. The State Railways have erected tanks at the ports of Rosario and Santa Fe on the Parana river and are now putting up 70 distribution tanks.

It is estimated that if the destruction of the forests continues at the present rate, 50,000,000 trees a year, the country will be without trees in 30 years. The government oil is now sold at the current market price and not at a fixed price as formerly; naturally this has led to a decrease in the price of fuel.

Equipment and Supplies

Locomotives

THE LEHIGH VALLEY is inquiring for 5 locomotives.

THE SOUTHERN PACIFIC has ordered 55 locomotive boosters from the Franklin Railway Supply Company.

THE NEW YORK CENTRAL has ordered 100 locomotive boosters from the Franklin Railway Supply Company.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS, reported in the *Railway Age* of June 3 as inquiring for 5 Mountain and 5 Mikado locomotives, has ordered the 5 Mikado locomotives from the Baldwin Locomotives Works.

Freight Cars

MIDLAND TERMINAL.—This company is inquiring for 10 dump cars.

THE PENNSYLVANIA has ordered 16,000 continuous joints from the Rail Joint Company.

THE ST. LOUIS SOUTHWESTERN is considering the purchase of 100 automobile cars.

MISSOURI, KANSAS & TEXAS.—This company is inquiring for 25 dump cars of 20 yd. capacity.

The DETROIT & MACKINAC has ordered 2,000 continuous joints from the Rail Joint Company.

THE CHICAGO, MILWAUKEE & ST. PAUL is asking prices for repairs to 300 all steel hopper cars.

THE MICHIGAN CENTRAL has ordered 20,000, 100 per cent joints from the Rail Joint Company.

THE WABASH has placed an order with the Decatur Bridge Company for 689 tons of steel to be used for 500 car underframes.

THE MISSOURI, KANSAS & TEXAS has placed an order with the General American Car Company for 200 refrigerator cars of 40 tons capacity.

THE TENNESSEE CENTRAL, reported in the *Railway Age* of April 15 as inquiring for 350 gondola cars, has ordered this equipment from the Western Steel Car & Foundry Co.

THE GRAND TRUNK, reported in the *Railway Age* of May 20 as inquiring for 250 refrigerator cars, has ordered this equipment from the National Steel Car Corporation, Hamilton, Ont.

THE NEW YORK, CHICAGO & ST. LOUIS, reported in the *Railway Age* of June 10 as inquiring for 1,000 automobile box cars, has ordered this equipment from the Illinois Car & Manufacturing Company.

THE FLORIDA EAST COAST, reported in the *Railway Age* of May 27, as inquiring for 30 tank cars of 10,000 gal. capacity, has ordered this equipment from the General American Tank Car Corporation.

THE NORTHERN PACIFIC, reported in the *Railway Age* of May 13 as inquiring for a large number of cars, has ordered 250 ballast cars, included in that number from the Rodger Ballast Car Company.

WESTERN PACIFIC.—This company, reported in the *Railway Age* of June 10, as considering the purchase of a large number of refrigerator cars, has received prices on 2,000 of these cars. It is expected that an order will be placed late this week or early next.

THE ERIE, reported in the *Railway Age* of June 10 as having let repairs to 1,500 freight cars, has contracted for the following additional repair work: 1,000 cars to the Buffalo Steel Car Company; 1,000 to the Youngstown Steel Car Company; 1,000 to the Illinois Car & Manufacturing Company and 500 to the Western Steel Car & Foundry Company.

THE WABASH, reported in the *Railway Age* of June 10, as inquiring for 2050 composite gondola car bodies of 50 tons capacity and 1,500 steel underframe automobile cars, 40 ft. in length and of 40 tons capacity, has ordered the former from the General American Car Company, and 750 of the latter from the American Car & Foundry Company and 750 from the Pullman Company.

THE ILLINOIS CENTRAL, reported in the *Railway Age* of May 13 as inquiring for repairs to 4,000 cars, has contracted with the Streator Car Company for repairs to 1,300 automobile box cars, with the Interstate Car Company for 500 box cars, with the Illinois Car Company for 300 steel general service cars, and the Ryan Car Company for 600 steel general service cars. These orders are in addition to the one given to the Pullman Company for repairs to 800 box cars reported in last week's issue. The company will also repair 500 cars in its Burnside shops.

Passenger Cars

THE NEW YORK, CHICAGO & ST. LOUIS is inquiring for one business car.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE is reported to be considering the purchase of five passenger coaches.

THE INTERBOROUGH RAPID TRANSIT COMPANY, reported in the *Railway Age* of May 20, as inquiring for 100 new cars, has ordered this equipment from the Pullman Company with an option on some additional cars.

Iron and Steel

THE SEABOARD AIR LINE has ordered 3,000 tons of rail from the Tennessee Coal, Iron & Railroad Co.

ALABAMA & VICKSBURG has ordered 190 tons of steel from the American Bridge Company for a bridge at Vicksburg, Miss.

THE MICHIGAN CENTRAL is inquiring for 8,000 tons of structural steel for a bridge across the gorge at Niagara Falls, N. Y.

THE SIAM STATE RAILWAYS are asking for bids at Bangkok, Siam, until 2 p. m. October 1, 1922, for superstructures of steel railway bridges. General Purachatra is commissioner general of the state railways. Specifications and plans may be obtained from C. B. Sandberg, 143 Liberty street, New York City.

THE MICHIGAN CENTRAL will receive bids until June 30 for the fabrication, delivery and erection of the necessary structural steel, including castings, rollers, railings, etc., for its proposed 640 ft. steel arch and approaches aggregating approximately 7,500 tons, to be constructed over the Niagara river between the city of Niagara Falls, Ont., and Niagara Falls, N. Y.

Track Specialties

THE NORFOLK & WESTERN is inquiring for about 3,000 tons of plates, shapes and bars.

THE MISSOURI, KANSAS & TEXAS, reported in the *Railway Age* of June 10, as inquiring for 800,000 tie plates, 300,000 of which were to be for 66-lb. rail and 500,000 for 85 to 90-lb. rail, has ordered this material from the Railroad Supply Company, Chicago.

Machinery and Tools

THE CHICAGO, ROCK ISLAND & PACIFIC is preparing to send out inquiries for a large list of machine tools.

THE ATCHISON, TOPEKA & SANTA FE is expected to place orders within the next week against its large outstanding machine tool inquiry.

THE SOUTHERN PACIFIC has ordered a 200-ton locomotive lifting crane of 77 ft. span, and a 15-ton overhead crane of 75 ft. span, from the Niles-Bement-Pond Company.

Supply Trade News

J. S. O'Connor, Standard Supply Company, 315 Beatty Building, Houston, Texas, has been appointed Texas agent for the **Track Specialties Company.**

F. S. Wilcoxen, formerly system fuel supervisor of the Chicago Great Western, has joined the service department of the **Edna Brass Mfg. Company,** Cincinnati, Ohio.

The Carborundum Company, Niagara Falls, N. Y., has appointed the **American Abrasive Metals Company,** 50 Church street, New York, to act as United States sales representative for the Carborundum anti-slip tile.

The Northwest Engineering Company, Green Bay, Wis., manufacturers of crawler trains and draglines, has moved its general sales offices to 1220 Steger building, Chicago. **W. W. Mutter,** vice-president, is in charge of this office.

Orton & Steinbrenner Company, manufacturers of locomotives' cranes, grab buckets and coal crushers, have moved their offices from the 11th to the 19th floor of the Transportation Building, 608 South Dearborn street, Chicago.

J. W. McCabe has been appointed manager of the St. Louis branch of the Chicago Pneumatic Tool Company. Mr. McCabe has been connected with that company for 20 years and has recently returned from a three years' business trip around the world.

H. B. Thurston, whose appointment as sales manager of the **Talmadge Manufacturing Company,** Cleveland, Ohio, was noted in the *Railway Age* of April 8, has for the past ten years been inspector for the Interstate Commerce Commission with headquarters at Pittsburgh, Pa. While with the commission and during the strike and congestion period of 1920 he was appointed chairman of the Pittsburgh Terminal Committee, working in that office until the trouble was over. Later he worked in conjunction with the Bureau of Accounting through the guaranty period. Mr. Thurston served about 23 years with various railroads in the capacity of general foreman of boilers and general inspector. He was for 13 years with the Pennsylvania Railroad as division inspector and for a number of years with the Pittsburgh, Shawmut & Northern and the Philadelphia & Reading. He also served as railroad inspector at locomotive builders' plants; also as a Pennsylvania State inspector.

H. B. Thurston

On June 24 the **American Bridge Company,** New York, will move its vice-president's, chief engineer's, eastern division contracting, and treasury departments to 71 Broadway. The eastern division engineering, traffic department and eastern division sub-contract departments will remain at 30 Church street.

The Black & Decker Manufacturing Company, Baltimore, Md., has established a new Detroit office in the General Motors building in that city. **C. G. Odell,** assistant to the president of this company will make this office his headquarters, in addition to which it will provide headquarters for the local Detroit representative.

James I. Vincent has been appointed eastern representative of the **Chicago Bascule Bridge Company** with offices at 30 Church street, New York. Mr. Vincent, who was graduated from the University of Michigan in 1896, spent several years with bridge fabricating companies and railroads. In 1903 he joined the Scherzer Rolling Lift Bridge Company where, from 1905 to 1912, he was in charge of its New York office except during 1908, which year he spent abroad in charge of the construction of a bridge in Burmah, and in obtaining orders in Europe. From 1912 until very recently Mr. Vincent was eastern representative of the Strauss Bascule Bridge Company in charge of the New York office.

W. Woodward Williams has been appointed vice-president of the **Titan Iron & Steel Company,** Newark, N. J. Mr. Williams' experience in the iron and steel industry began immediately upon his graduation from Harvard University in 1905. After six years in the mills of the Carnegie Steel Company at Pittsburgh, Duquesne, Pa., and Youngstown, Ohio, he entered the sales department of the Bourne-Fuller Company of Cleveland, Ohio, and was later appointed manager of its Pittsburgh office. In January, 1914, he became general manager of sales of the A. M. Byers Company, Pittsburgh, and subsequently was made general manager. In August, 1919, he became general manager of the Reading Iron Company, being later elected vice-president in charge of sales and operations. In September, 1920, he became associated with the Pittsburgh Gage & Supply Company, jobbers of wrought iron merchant pipe. He resigned the vice-presidency of this company on May 31 of this year, entering immediately upon his present office of vice-president of the Titan Iron & Steel Company.

W. W. Williams

Signal Appliance Association Officers

The Signal Appliance Association held its annual meeting and election of officers at Spring Lake, N. J., on June 16, in connection with the annual meeting of the Signal Section of the American Railway Association. The officers elected for the following year are G. A. Blackmore, vice-president, Union Switch & Signal Company, chairman; E. A. Condit, Jr., The Rail Joint Company, vice-chairman; F. W. Edmunds, Sunbeam Electric Company, New York, secretary. The board of directors for the ensuing year are J. Warren Young, Kerite Insulated Wire & Cable Company; L. Thomas, General Railway Signal Company; W. J. Gillingham, Hall Switch & Signal Company; J. S. Hobson, Massey Concrete Products Corporation; R. E. Trout, Thomas A. Edison, Inc.; S. G. Johnson, Okonite Company; M. R. Briney, Federal Signal Company; G. A. Nelson, Waterbury Battery Company, and Henry Lee, *Railway Age*.

Obituary

Joseph Maycock, for more than 20 years a railway representative of Pratt & Lambert, Inc., Buffalo, N. Y., died at his home in that city on June 15. Mr. Maycock was formerly master painter of the Erie.

Trade Publications

"G-R-S Automatic Train Control" is the title of Bulletin No. 138, which has been issued by the General Railway Signal Company, Rochester, N. Y., describing its apparatus for automatic train speed control and also auto-manual train control. Accounts of the experiments recently made with this apparatus were given in the *Railway Age* of October 29, 1921, and March 4, 1922.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company has authorized extensive repairs to the crossing over the San Gabriel river near Los Angeles, Cal. This is to include the construction of a 32 by 704 ft. spillway and the rebuilding of a pier destroyed by a flood.

CANADIAN PACIFIC.—This company, reported in the *Railway Age* of March 18, as about to construct coaling plants at Swift Current, Sask., Medicine Hat, Alta., La Riviere, Man., and Eagle River, Ont., has awarded contracts to the Claydon Company, for the plants at Eagle River, Ont., and La Riviere, Man., and a contract to D. E. Hughes, Calgary, Alta., for the plant at Medicine Hat, Alta. The Swift Current plant will be built by company forces.

This company, which was reported in the *Railway Age* of March 25 as calling for bids for the construction of a new bridge over the Coquitlam river, Vancouver, B. C., to replace the structure washed away during the November flood, has ordered the steel from the Canadian Bridge Company and has awarded the contract to W. D. Grant, Vancouver, for the construction of the concrete abutments necessary for the new structure.

CHESAPEAKE & OHIO.—This company which was reported in the *Railway Age* of June 10, as calling for bids for the construction of terminal facilities at Peach Creek, W. Va., involving a five-stall engine house addition, a shop, storehouse and power house, and for the construction of a five-stall addition to its roundhouse and shop at Peru, Ind., has awarded the contract for this work to Joseph E. Nelson & Sons, Chicago, the work at Peru and Peach Creek to involve expenditures of approximately $125,000 and $350,000, respectively.

CHICAGO & ALTON.—The Interstate Commerce Commission has issued a certificate authorizing the construction of an extension from Titus, Ill., south about 3¼ miles, and a branch from a point about two miles south of Titus and extending westerly approximately two miles.

CHICAGO, BURLINGTON & QUINCY.—This company is calling for bids for a new five stall roundhouse at Council Bluffs, Iowa, a combination freight and passenger station at West Frankfort, Ill., and for the construction of a power house addition at Plattsmouth, Neb.

CHICAGO, BURLINGTON & QUINCY.—This company, which was reported in the *Railway Age* of June 3, as about to close bids for the construction of a passenger station at Mitchell, Neb., has awarded the contract for this work to G. A. Johnson, Chicago; and has awarded a contract to Frank Jacoby, Billings, Mont., for the construction of station extensions at Thermopolis, Wyo., which were first awarded to B. J. Martin, Billings, Mont., as reported in the *Railway Age* of June 10.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—This company is calling for bids for the construction of a passenger station at 38th street, Indianapolis, Ind.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has awarded a contract for the construction of a water softening plant at Council Bluffs, Iowa, to Joseph E. Nelson & Sons, Chicago.

CHICAGO UNION STATION.—This company, reported in the *Railway Age* of March 20 as calling for bids for the widening of Canal street between Madison and Washington streets, a distance of about 600 ft., has awarded the contract to George P. Cullen, Chicago, and has awarded a contract to Paschen Bros. Co., Chicago, for the superstructure for the Union Station power house reported in the *Railway Age* of June 10 as the subject of bids. A contract has also been awarded to the Mellon Stewart Company, Chicago, for the construction of a concrete and steel viaduct over the tracks at Madison street, as noted in the *Railway Age* of June 17.

CINCINNATI NORTHERN.—This company will accept bids until July 3 for eight bridge spans.

ILLINOIS CENTRAL.—This company which was reported in the *Railway Age* of April 22, as accepting bids for the construction of a joint passenger station with the Toledo, Peoria & Western at Gilman, Ill., has awarded the contract for this work to the Ellington-Miller Company, Chicago, the work to cost approximately $48,000.

ILLINOIS CENTRAL.—This company, which was reported in the *Railway Age* of June 10, as calling for bids for the installation of a mechanical hump and track scale at Centralia, Ill., has awarded the contract for this work to Joseph E. Nelson & Sons, Chicago.

KANSAS CITY SOUTHERN.—This company is now preparing plans for and expects to undertake in the near future with its own forces, improvements to its shop at Pittsburg, Kan., which will consist principally of erecting 160-ft. and 110-ft. extensions to the present structure to provide facilities respectively for additional erecting space and for a blacksmith shop, and a 64-ft. extension to the present transfer table. The building will have a concrete foundation, brick walls with wire glass in metal sash, and composition roofing supported on steel trusses. Each of the six bays in the extensions to the erecting shop will be provided with engine pits to be served by a 10-ton and a 250-ton traveling crane. The work will cost approximately $200,000.

MICHIGAN NORTHERN.—The Interstate Commerce Commission, after a rehearing has denied this company's application for authority to construct a new line out of Lansing, Mich., on the ground that public convenience and necessity are not shown to require it.

MISSOURI PACIFIC.—This company is calling for bids for the construction of an interlocking tower at Kenneth, Kan.

UNION PACIFIC.—This company, which was reported in the *Railway Age* of April 29, as planning to construct the substructure of a bridge across the Columbia river near Attalia, Wash., this season, has awarded the contract for this work to the Missouri Valley Bridge & Iron Works, Kansas City, Mo.

UNION PACIFIC.—This company is calling for bids for extensions to the eating house at Cheyenne, Wyoming, to exceed $50,000 and for the lining of two tunnels in Wyoming.

WABASH.—This company is calling for bids for the construction of the reclamation plant at Decatur, Ill.

WESTERN PACIFIC.—This company has obtained authority from the War Department to reconstruct its drawbridge across the San Joaquin river about 14 miles south of Stockton, Cal., and has notified the public of its intention to close navigation some time during the period from July 15 to January 1 for the purpose of undertaking this work.

ILLINOIS CENTRAL RULES FOR STORING COAL.—The Illinois Central has issued rules governing the unloading and caring for storage coal. The ground upon which coal is to be stored must be firm, level, clean and properly drained, although no drainage should pass through or under the storage coal piles. Coal, which is unloaded into storage should not be placed on loose cinders, against woden posts, wooden trestle bents or hot or warm pipes or flues; nor should it be placed in piles to exceed 12 ft. in height and 36 ft. in width at ground level, with the piles limited to 1,500 tons, and spaced with intervening distances of at least 5 ft. The piles must not be ventilated by artificial methods. Coal of different sizes should be placed in separate units and this same practice of segregation holds true when unloading coal of same size from different mines. Coal should not be dropped from the grab buckets more than 3 ft. The coal should not be moved after once being placed in storage, unless absolutely necessary. The temperature of the coal should be taken at least once each week, and oftener if possible, using either the thermometer or rod method; and when coal is stored under cover, the structure should be well ventilated to afford outlet for gases. Under no circumstances should water be applied to a heated coal pile. Heated or burning coal should be removed and used, or extinguished by scattering and then applying water.

Railway Financial News

ANN ARBOR.—*Annual Report.*—The corporate income account for the year 1921 and the consolidated income account for the year 1920 follow:

	1921	1920
Operating revenues	$5,122,112	$5,385,992
Operating expenses	4,209,106	4,953,662
Net from railway operations	913,006	432,330
Railway tax accruals	257,278	250,027
Railway operating income	655,620	181,966
Total non-operating income	56,161	63,957
Gross income	711,781	245,923
Interest on funded debt	366,317	358,080
Total deductions from gross income	632,732	772,417
Net income	79,049	Def. 526,494

BALTIMORE & OHIO.—*Equipment Notes Offered.*—J. S. Wilson & Co., of Baltimore, Freeman & Co., and Hayden, Stone & Co., are offering $1,502,800 Baltimore & Ohio System, Morgantown & Kingwood Railroad Company, 6 per cent equipment gold notes, maturing $115,600 annually, January 15, 1923, to January 15, 1935, inclusive, at prices to yield from 5 per cent to 5.75 per cent. The notes are redeemable as a whole, but not in part, on 60 days' notice at 103. They are guaranteed, principal and interest, by the Baltimore & Ohio Railroad. The notes are a first lien on 1,000 55-ton hopper coal cars.

CAMBRIA & INDIANA.—*Authorized to Issue Bonds.*—The Interstate Commerce Commission has authorized an issue of $1,000,000 of general mortgage 6 per cent bonds to be sold at not less than 97¾, the proceeds to be used to pay notes and to reimburse the treasury for expenditures for additions and betterments.

CENTRAL OF NEW JERSEY.—*Authorized to Issue Equipment Bonds.*—The Interstate Commerce Commission has authorized the sale or pledge of $2,000,000 of 6 per cent equipment trust bonds at not less than 98.

CHESAPEAKE & OHIO.—*Annual Report.*—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "Chesapeake & Ohio Not Hurt by Coal Strike." See also excerpts from annual report on adjacent pages.

CHICAGO & EASTERN ILLINOIS.—*Guaranty Certified.*—The Interstate Commerce Commission has certified the amount of this company's guaranty for the six months' period of 1920 as $2,223,982, of which $723,982 remained to be paid.

CHICAGO & NORTH WESTERN.—*Guaranty Certified.*—The Interstate Commerce Commission has issued a final certificate certifying the amount of this company's guaranty for the six months' period of 1920 as $15,533,520 of which $3,733,520 was still to be paid.

CHICAGO, MILWAUKEE & ST. PAUL.—*Equipment Trusts Offered.*—White, Weld & Co. are offering a new issue of $8,085,000 equipment trust 5 per cent gold certificates, series "A." The certificates are dated July 15, 1922. They are due $539,000 annually from July 15, 1923, to 1937, inclusive, and are offered at prices to yield from 5 per cent to 5.40 per cent, according to maturity.

CHICAGO, ROCK ISLAND & PACIFIC.—*Payment on Account of Loan.*—The War Finance Corporation announces that it has received a repayment of $5,500,000 on account of loans aggregating $10,430,000 made to this company in 1918 and 1919. It is expected the balance will be repaid in the near future.

DULUTH & NORTHERN MINNESOTA.—*Report Approving Abandonment Reaffirmed.*—The Interstate Commerce Commission, after a rehearing on the petition of the attorney general of Minnesota, has reaffirmed the conclusions of its former report authorizing the abandonment of this company's line from Knife River to Cascade, Minn., 99.25 miles. Chairman McChord dissented on the ground that greater consideration should have been given to an offer of the Minnesota Forest Products Company's offer to purchase the property. Commissioners Cox and Lewis also dissented.

EASTERN MAINE.—*Certificate for Construction Denied.*—The Interstate Commerce Commission has denied the application of this company and the Mattawamkeag & Eastern for a certificate authorizing the construction of new lines of railroad between Houlton and Bangor, Me.

GREAT NORTHERN.—*Dividend Declared.*—This company has declared a semi-annual dividend of 3½ per cent on the preferred stock. Although at the regular 7 per cent rate, this declaration is the first to be made on a semi-annual payment basis instead of quarterly. Total dividend payment for the year will be 5¼ per cent. The first quarter dividend was 1¾ per cent; the next semi-annual payment will not be due until February 1, 1923.

New Director.—A. C. Loring, president of the Pillsbury Milling Company, has been elected a director to succeed E. C. Lindley, vice-president and general counsel, resigned.

HOCKING VALLEY.—*Annual Report.*—This company's annual report for 1921 is reviewed in an article on another page of this issue entitled "The Hocking Valley's Place in the C. & O. System." See also excerpts from annual report on adjacent pages.

KANSAS CITY, MEXICO & ORIENT.—*Employees to Decide Fate of Road.*—Receiver W. T. Kemper met the employees of this road in conference at Wichita, Kan., on June 17, for the purpose of discussing the road's financial condition and outlining a plan under which service may be continued. He stated that for the first five months of this year the road has incurred a deficit of $450,000, that it has a bank account of only $46,000 remaining, and that unless financial assistance is obtained immediately the property will have to be sold at auction after July 1. Mr. Kemper called upon employees of the road to accept a wage cut as the only means of allowing the road to reduce its operating expenses. He sketched the history of the line and said the road, if completed, would be 1,687 miles in length, extending from Kansas City, Mo., to Topolobampo, Mexico, on the Gulf of California. Governors Allen, of Kansas and J. B. A. Robertson, of Oklahoma, were present at the conference as were a number of the members of the railroad and public utilities commissions of the three states in which the road operates. Previous attempts have been made by the local management of the railroad to interest the employees in a proposition whereby they would voluntarily accept slightly reduced wages scale in order to enable the road to continue operations, but to date none have been effective. The K. M. & O. went into receivership on April 16, 1917. It operates 273 miles of road in Kansas and Oklahoma, while the Kansas City, Mexico & Orient of Texas operates 464 miles of line in the Lone Star state.

NEW YORK CENTRAL.—*Equipment Trusts Offered.*—J. P. Morgan & Co. and associates are offering an issue of $27,645,000 5 per cent New York Central Lines equipment trust certificates at prices to yield from 5 per cent to 5.30 per cent. The certificates mature $1,843,000 per year from June 1, 1923, to June 1, 1937, both inclusive. They are to be sold subject to the approval of the Interstate Commerce Commission.

NEW YORK, LACKAWANNA & WESTERN.—*Asks Authority to Issue Securities.*—This company has applied to the Interstate Commerce Commission for authority to issue $30,000,000 of first and refunding mortgage bonds and $5,000,000 of additional capital stock. The Delaware, Lackawanna & Western also asks authority to guarantee the bonds. It is proposed to issue at this time $12,000,000 of the bonds at 5 per cent to reimburse the lessee for expenditure, $1,639,000 to retire a note of the lessor to the lessee, also $10,000,000 to retire consolidated mortgage bonds and terminal and improvement mortgage bonds maturing next year.

NEW YORK, NEW HAVEN & HARTFORD.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $5,900,000 of first and refunding mortgage bonds to be deposited as collateral security for loans from the United States.

President Pearson on B. & M. Control Reports.—In a statement given out on June 21 President E. J. Pearson, of the New York, New Haven & Hartford, stated that the New Haven is making no attempt to control the Boston & Maine or interfere in any manner in the handling of matters between the Boston & Maine and those in the territory which it serves. He added that the only interest of the New Haven is to promote policies and practices that are of mutual interest toward such co-operation

within New England with respect to its transportation as is brought about from time to time by the New England states and the public in regard to other matters of important but common interest.

Concerning the rumored attempt at control of the New Haven or of the New England situation by the Pennsylvania Railroad, Mr. Pearson quoted the statement of President Rea of the Pennsylvania that there has been no change during the past ten years in the holdings of New Haven stock by the Pennsylvania which approximates but three per cent of the total, and that no attempt or arrangements have been or are being made for securing control of the New Haven, or purchasing its capital stock. The only purpose of the Pennsylvania is to be helpful to the New England railroads and their patrons by increasing the traffic exchange facilities, which is indicated by the large expenditure for the construction of the New York Connecting Railroad for the unbottling of the New York gateway, and the operation of joint through trains where required by the New England traffic. This means the continuance and expansion of those long established friendly business and traffic relations of about 50 years between the New England states and the populous territory served by the Pennsylvania Railroad System and the railroads west and south with which it exchanges traffic.

NEW ORLEANS-GREAT NORTHERN.—*Guaranty Certified.*—The Interstate Commerce Commission has issued a final certificate certifying the amount of this company's guaranty for the six months of 1920 at $366,555, of which $131,055 was still to be paid.

NORFOLK SOUTHERN.—*Asks Authority for Equipment Notes.*—This company has applied to the Interstate Commerce Commission for authority to issue $375,000 of 10-year equipment trust or conditional sales agreement notes at 6 per cent for the purchase of 397 rebuilt freight cars. The notes are to be pledged as collateral for a loan from the government.

PITTSBURGH & WEST VIRGINIA.—*To Vote on Stock Increase.*—A special meeting of stockholders will be held at Pittsburgh on July 27 to vote upon the proposed increase of authorized capital stock from $47,000,000 to $51,900,000, increase to consist of 49,000 shares (par $100). Holders will also be asked to vote on issuance of the new shares as preferred stock.

In regard to the proposed stock increase President H. E. Farrell says:

Since April 1, 1917, the company has expended for additions and betterments over $2,000,000, and the total will reach nearly $3,000,000 by the end of this year. Reason for issuing $4,900,000 of additional stock instead of $3,000,000 is to provide for future improvements and obviate the necessity of calling a meeting of stockholders and going to the Interstate Commerce Commission for authorization again in a year or so. Following favorable action on July 27, 1922, application will be made to the Commission for authority to issue $4,900,000 preferred stock, to remain in the treasury available for future corporate needs.

The $7,400,000 authorized by stockholders November 15, 1920, has not been issued, as we are awaiting the approval of the Interstate Commerce Commission, which we hope shortly. This $7,400,000 is to take the place of the $1,080,000 capital stock of, and $6,320,000 of advances to, West Side Belt Railroad, upon acquisition of property of that corporation. The issuance of $7,400,000 stock is to remain in the company's treasury available for future corporate needs.

Present and proposed situation of the issuance of stock is as follows:

	Common	Preferred	Total
Outstanding	$30,500,000	$9,100,000	$39,600,000
Authorized by stockholders and awaiting approval of I. C. C.	4,400,000	3,000,000	7,400,000
Present authorization	$34,900,000	$12,100,000	$47,000,000
Proposed issues to reimburse treasury for expenditures made and to be made for additions, improvements and betterments.	.....	4,900,000	4,900,000
Total proposed	$34,900,000	$17,000,000	$51,900,000

READING COMPANY.—*Bondholders' Protective Committee.*—A protective committee for the Reading Company general mortgage 4 per cent bonds, due January 1, 1997, has been organized by holders of approximately $12,000,000 of the bonds. The total amount of the issue outstanding is about $94,000,000. James M. Willcox, vice-president of the Philadelphia Saving Fund Society, is chairman, and A. S. Fenimore, assistant secretary of that institution, is secretary of the committee. Other members are:

George W. Davison, president Central Union Trust Company, New York; William A. Day, president Equitable Life Assurance Society, New York; Edward B. Duffield, vice-president Prudential Life Insurance Company, Newark, N. J.; William P. Gest, president Fidelity Trust Company; Effingham B. Morris, president Girard Trust Company; C. S. W. Packard, president Pennsylvania Company, and Asa S. Wing, president Provident Life Insurance and the Provident Trust companies. Henry Pepper, Bodine & Stokes, of this city, are counsel.

The organization of the committee is a result of the recent decision of the United States Supreme Court in ordering modifications in the contract provisions of the mortgage under the segregation plan.

The Reading Company has filed a petition in the United States District Court at Philadelphia asking permission to consult with the bondholders' protective committee for presentation of a modified dissolution plan in the Reading case in conformity with the recent decision of the Supreme Court. The court directed that the petition be filed and it will be acted on later. A petition also was filed by members of the bondholders' committee to intervene in the case because of the Supreme Court decision. The petition was allowed by the court.

SEABOARD AIR LINE.—*Annual Report.*—The income account for the year ended December 31, 1921, compares with the previous year as follows:

	1921	1920
Gross revenue	$42,844,933	.....
Operating expenses, taxes, uncollectible railway revenues and equipment and joint facility rents—net.	40,782,562	.....
Net railway operating income	*2,062,372	$2,481,981
Compensation accrued—federal control	†1,473,279	1,153,337
Government guaranty, six months	.....	3,460,012
Other income	1,453,689	423,884
Gross income	4,989,340	7,519,215
Applicable to interest	4,768,759	7,226,772
Fixed interest charges	5,201,299	5,745,705
Balance	Dr. 432,540	1,481,067
Interest adjustment mortgage (income) bonds	Cr. ‡208,333	1,250,000
Net income	Dr. 224,207	231,067

*Includes the same accounts that were used in determining the standard return; 1920 figures are for period Sept. 1-Dec. 31.

†1921 figures are an accrual of estimated additional compensation for the entire period of federal control; 1920 figures are an accrual for January and February.

‡Reversal of November and December, 1920, accrual.

TUCKASEEGEE & SOUTHEASTERN.—*Authorized to Issue Stock.*—This company has been authorized by the Interstate Commerce Commission to issue $300,000 of capital stock at par for the purpose of acquiring the railroad from Sylva to Blackwood, N. C., 12.26 miles.

VIRGINIAN TERMINAL.—*Authorized to Issue Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue $909,000 of first mortgage 50-year gold bonds to be delivered to the Virginian in reimbursement of advances. The Virginian is also authorized to guarantee the bonds and to issue a similar amount of like bonds to be pledged with the director general of railroads in connection with the funding of indebtedness.

Railroad Administration Settlements

The Administration reports the following final settlements, and has paid out to or received from the several roads the following amounts:

Wiggins Ferry Company	$145,000
Terminal Railroad Association of St. Louis	60,000
St. Louis Merchants Bridge Terminal paid Director General	205,000
Little Kanawha paid Director General	1,100
Belington & Northern paid Director General	495

Dividends Declared

Atlantic Coast Line.—3½ per cent, semi-annually, payable July 10 to holders of record June 24.

Canada Southern.—1½ per cent, payable August 1 to holders of record June 30.

Chicago, Burlington & Quincy.—5 per cent, semi-annually, payable June 26 to holders of record June 19.

Cincinnati, New Orleans & Texas Pacific.—Common, 3½ per cent, semi-annually; extra, 3 per cent; both payable June 26 to holders of record June 16.

Colorado & Southern.—1st preferred, 2 per cent, semi-annually, payable June 30 to holders of record June 19.

El Paso & Southwestern.—1¼ per cent, quarterly, payable July 1 to holders of record June 28.

Great Northern—Preferred 3½ per cent semi-annually, payable August 1 to holders of record June 30.

Joliet & Chicago.—$1.75, quarterly, payable July 3 to holders of record June 20.

Kansas City Southern.—Preferred, 1 per cent, payable July 15 to holders of record June 30.

Lehigh Valley.—Preferred, 2½ per cent, quarterly; common, 1¾ per cent, quarterly; both payable July 1 to holders of record June 17.

Louisville & Nashville.—3½ per cent, semi-annually, payable August 10 to holders of record July 17.

Reading Company.—Common, 2 per cent, quarterly, payable August 10 to holders of record July 18; 1st preferred, 1 per cent, quarterly, payable September 14 to holders of record August 29.

Western Pacific.—Preferred, 1½ per cent, quarterly, payable July 1 to holders of record June 19.

Northern Pacific.—1¼ per cent, quarterly, payable August 1 to holders of record June 30.

Trend of Railway Stock and Bonds Prices

	June 20	Last Week	Last Year
Average price of 20 representative railway stocks	64.42	64.18	51.56
Average price of 20 representative railway bonds	85.47	85.62	72.65

Annual Reports

Forty-fourth Annual Report of The Chesapeake and Ohio Railway Company

RICHMOND, VA., April 17, 1922.

TO THE STOCKHOLDERS:

The Forty-fourth Annual Report of the Board of Directors, for the fiscal year ended December 31, 1921, is herewith submitted.

The average mileage operated during the year was 2,545.9 miles, an increase over the previous year of 26.7 miles. The mileage at the end of the year was 2,548.0 miles, an increase of 8.8 miles over mileage on December 31, 1920.

THE CHESAPEAKE AND OHIO RAILWAY COMPANY

RESULTS FOR THE YEAR.

Operating Revenues	$83,687,957.92
(Decrease $6,502,787.22, or 7.21%)	
Operating Expenses	66,603,076.81
(Decrease $11,141,444.37, or 14.33%)	
Net Operating Revenue	$17,084,881.11
(Increase $4,638,657.15, or 37.27%)	
Taxes and Uncollected Railway Revenue	2,702,869.27
(Decrease $297,090.45, or 9.90%)	
Railway Operating Income	$14,382,011.84
(Increase $4,935,747.60, or 52.25%)	
Net Equipment and Joint Facility Rents	Dr. *721,085.64*
(Decrease $2,433,147.88, or 142.12%)	
Net Railway Operating Income	$13,660,926.20
(Decrease $598,263.06, or 4.19%)	
Miscellaneous Income	1,120,750.48
(Decrease $780,832.76 or 41.06%)	
Total Gross Income	$14,781,676.68
(Decrease $1,379,095.82, or 8.53%)	
Rentals and Other Payments	897,673.69
Increase $676,766.09, or 24.60%)	
Income for the year available for interest	$13,884,002.99
(Decrease $2,055,861.91, or 12.90%)	
Interest (69.80% of amount available) amounted to	9,691,401.51
(Decrease $262,005.18, or 2.63%)	
Net Income for the year, equivalent to 6.68% of capital stock outstanding, amounted to	$4,192,601.48
(Decrease $1,793,856.73, or 29.96%)	
2% Dividend declared during year payable January 3, 1922	1,255,632.00
Remainder, devoted to improvement of physical and other assets	$2,936,969.48

RETURN ON PROPERTY.

The following table shows the amount of return to your Company, including subsidiary companies, from transportation operations only, upon its investment in road and equipment at the termination of each year of the five year period ended December 31, 1921, and the average for the five years:

	Property Investment.	Total Operating Income.	Percentage of Return.
Year ended December 31, 1921	$304,485,230.91	$12,924,848.76	4.24%
*Year ended December 31, 1920	291,179,583.14	14,410,821.80	4.95%
*Year ended December 31, 1919	287,864,838.63	13,725,866.83	4.77%
*Year ended December 31, 1918	269,914,419.76	12,871,539.79	4.77%
Year ended December 31, 1917	263,397,068.67	14,871,459.45	5.64%
Yearly average for five years ended December 31, 1921	$283,368,228.22	$13,760,907.32	4.85%

*The road having been operated in 1918, 1919 and during January and February, 1920, by the United States Railroad Administration, the compensation payable during the period mentioned has been used in lieu of operating and other items making up the return from transportation operations. In these computations, interest payable by way of compensation for additions and betterments completed during Federal control has been excluded.

FINANCIAL.

During 1921 the issue of six per cent. Equipment Trust Notes, Series 13 and 13-A, referred to in the Annual Report for 1920, was completed, the total amount of the notes being fixed at an aggregate of $11,367,000, for the two trusts. Of this amount the annual maturities due January 15, 1921, and January 15, 1922, have been paid, the aggregate amount of said payments being $1,515,600. The equipment contracted for and subjected to "Chesapeake and Ohio Equipment Trust, Series S," referred to in the Annual Report for 1920, has all been delivered and is now in service.

Your Company at the date of this Report has received on account of the loan from the United States of $5,338,000, under the provisions of Section 210 of the Transportation Act, 1920, to be applied toward additions and betterments, the sum of $4,003,500. It is expected that the balance of the loan, $1,334,500, will be received before July first, and that the additions and betterments, toward the cost of which the proceeds of the loan have been appropriated, will be completed or contracted for by that date.

Your Company is now endeavoring to secure satisfactory bids for the following new equipment:

30 All Steel Passenger Coaches;
8 All Steel Combination Passenger and Baggage Cars;
25 All Steel Baggage, Express and Mail Cars;
5 All Steel Dining Cars;
1500 40-ton Steel-underframe Box Cars;
500 40-ton Steel-underframe Ventilated Box Cars;
200 40-ton Steel-underframe Stock Cars;
50 40-ton Steel-underframe Refrigerator Cars;
1500 57½-ton All Steel Flat Bottom Gondola Cars;
1500 57½-ton All Steel Hopper Bottom Gondola Cars.

Your Company expects to finance approximately 80% of the cost of this equipment through an Equipment Trust, which it is believed can be placed on terms advantageous to your Company.

The officers of your Company have also prepared a comprehensive budget of additions, betterments and improvements which should be made during the next four years in order to adequately and economically accommodate the present-day maximum volume of traffic, provide for anticipated growth, and render its facilities more nearly equal to those of your principal competitors. The estimated capital charge for the work contemplated by this budget is about $17,000,000, the expenditure of which will be spread over the next four years. Conditions at the present time are reasonably favorable for railroad financing and plans are now under consideration for providing at least a part of the total capital expenditure involved, announcement respecting which will be made in due course.

The changes in funded debt in the hands of the public during the year were as follows:

	Retired
4 per cent. Big Sandy Ry. First Mortgage Bonds	$33,000.00
4 per cent. Coal River Railway First Mortgage Bonds	37,000.00
4 per cent. Greenbrier Ry. First Mortgage Bonds	22,000.00
5 per cent. Kanawha Bridge and Terminal Co. First Mortgage Bonds	7,000.00
Equipment Trust Obligations	1,871,800.00
Decrease	$1,970,800.00

Other changes in obligations shown under funded debt on balance sheet of December 31, 1921, were as follows:

	Increase.
First Lien and Improvement 5 per cent. Mortgage Bonds	$8,541,000.00
6 per cent. Equipment Trust Certificates Series "13" (Additional)	162,000.00
Secured Obligations to United States Government	7,762,500.00
5 per cent. Chesapeake & Ohio Northern Ry. Co. First Mortgage 5 per cent. Bonds (Assumed)	1,000,000.00
Increase	$17,465,500.00

GENERAL REMARKS.

Branch Line Extensions during the year have been as follows:

Guyandot Division-Main Island Creek, Barnabas to End of Line	1.98 Miles
Guyandot Division-Little Creek Branch, Stirratt to End of Line	1.00 Miles
Island Creek Railroad-Mud Fork Branch, Mud Junction to Argonne, W. Va	3.25 Miles
Island Creek Railroad-Whitman Creek Branch, Whitman Junction to Whitman, W. Va	.79 Miles
Hazy Creek Branch-Edwight to End of Line	1.80 Miles
Huntington Division-Adjustment of Mileage	.05 Miles
making total increase in Branch Lines put into operation during the year	8.87 Miles

Additional third track mileage put into operation during the year is as follows:

Cincinnati Division-Edgington-Passing Track converted into third track	1.00 Miles
Extension of Third Track	1.73 Miles
making total increase in third track	2.73 Miles

The equipment inventory as of December 31, 1921, was as follows:

		Increase	Decrease
Locomotives owned	675	10	.....
Locomotives leased	271	.....	.....
Total	946	10	.....
Passenger train cars owned	348	7	.....
Passenger train cars leased	62	.....	.....
Total	410	7	.....
Freight train and miscellaneous cars owned	34,251	694	.....
Freight train cars leased	18,000	.....	.....
Total	52,251	694	.....

The changes during the year in the accrued depreciation of equipment account were as follows:

Balance to credit of account December 31, 1920		$12,430,963.54
Amount credited during year ended December 31, 1921, by charges to Operating Expenses	$2,047,384.78	
Charges to account, for:		
Accrued depreciation on equipment retired during year—891 freight train and work cars; 1 passenger train car; 2 locomotives; 2 floating equipment	$185,436.86	1,861,947.92
Balance to credit of account December 31, 1921		$14,292,911.46

	1921	1920		
Operating Revenues were	$83,687,957.92	$90,190,745.14	Dec.	$6,502,787.22
Net Operating Revenues were	17,084,881.11	12,446,223.96	Inc.	4,638,657.15
Operating Ratio	79.6%	86.2%	Dec.	6.6%
Tons of Revenue Freight carried one mile	9,136,050,511	11,720,030,889	Dec.	2,583,980,378
Revenue train loads, tons	1,090	1,131	Dec.	41
Revenue tons per loaded car	39.3	39.1	Inc.	.2

The revenue coal and coke tonnage was 24,074,459, a decrease of 18.0 per cent; other freight tonnage was 7,418,628, a decrease of 35.4 per cent. Total revenue tonnage was 31,493,087 tons, a decrease of 22.9 per cent. Freight revenue was $67,367,982.75, a decrease of 7.0 per cent. Freight train mileage was 8,382,284 miles, a decrease of 19.1 per cent. Revenue ton miles were 9,136,050,511, a decrease of 22.0 per cent. Ton mile revenue was 7.37 mills, an increase of 19.3 per cent. Revenue per freight train mile was $8,037, an increase of 14.9 per cent. Revenue tonnage per train mile was 1,090 tons, a decrease of 3.6 per cent;; including Company's freight, the tonnage per train mile was 1,149 tons, a decrease of 4.0 per cent. Tonnage per locomotive, including Company's freight, was 1,026 tons, a decrease of 1.9 per cent. Revenue tonnage per loaded car was 39.3 tons, an increase of .5 per cent. Tons of revenue freight carried one mile per mile of road were 3,588,535, a decrease of 22.9 per cent.

It will be observed that freight train mileage did not decrease in the same ratio as revenue tonnage and revenue ton miles, which is occasioned by the

fact that in times of decreased business it is not possible to dispense with the running of many local freights and other necessarily lightly loaded trains, which must result in lesser loading of tons per train and, consequently, more train mileage proportionately.

There were 7,950,673 passengers carried, a decrease of 9.3 per cent. The number carried one mile was 331,513,000, a decrease of 13.7 per cent. Passenger revenue was $11,739,627.10, a decrease of .6 per cent. Revenue per passenger per mile was 3,541 cents, an increase of 15.1 per cent. Number of passengers carried one mile per mile of road was 135,894, a decrease of 14.6 per cent. Passenger train mileage was 5,284,065, an increase of 1.9 per cent. Passenger revenue per train mile was $2.222, a decrease of 2.5 per cent; including mail and express it was $2.502, a decrease of 6.9 per cent. Passenger service train revenue per train mile was $2.577, a decrease of 5.7 per cent.

There were 33724.9 tons of new rail (8050.1 tons of 130 lb., 21196.5 tons of 100 lb., 3517.9 tons of 90 lb., 956.3 tons of 80 lb., and 4.1 tons 67½ lb.) equal to 206.7 miles of track, used in renewal of existing track.

There were 1,085,047 cross ties used in maintaining existing tracks, an increase of 32,678.

There were 626,034 yards of ballast (390,854 yards stone) used in maintaining existing tracks, a decrease of 265,024 yards. Beginning 1921 careful survey was made of the ballast needed on the entire line, and while there was a decrease in the number of yards of ballast applied as compared with previous year, our track has been fully maintained in equally as good condition as last year insofar as ballast is concerned.

The average amount expended for repairs for locomotive was $6,469.27; per passenger train car, $1,705.05; per freight train car $183.65.

Due to the complexity of the accounts involved and the necessity of carefully checking an enormous number of items, it has not yet been practicable for your Company to secure a final settlement with the Director General of Railroads for the period of Federal control or with the Interstate Commerce Commission for the so-called Guaranty Period, March 1 to September 1, 1920. Your directors and officers are making every effort to reach a conclusion of these matters as promptly as possible and are receiving the cordial cooperation of the Government authorities. During the year your Company received from the Secretary of the Treasury an additional payment of $600,000 on account of the guaranty under Section 209 of the Transportation Act, 1920, based upon a partial payment certificate of the Interstate Commerce Commission. As the amount of any further settlement on either of these accounts is still impossible of ascertainment no accrual in respect thereof has as yet been included in your income account.

In the Annual Report for 1920 reference was made to the substantial falling off in the volume of business subsequent to January 1, 1921, and the probability of a resulting unsatisfactory showing for the year 1921. The condition forecasted in the Annual Report continued during the early part of the year with the result that, notwithstanding the increase of about 33% in your Company's average freight rates effective in the summer of 1920, the gross earnings of your property during the first four months of the year were actually less than during the corresponding period of 1920. Meantime the heavy operating costs resulting from war conditions, particularly those due to the high wages and the working rules established by Governmental authority, continued, and your Company was unable, notwithstanding drastic reduction of working forces and curtailing of purchases wherever possible, to reduce expenses immediately to anything like the extent to which business fell off.

These conditions resulted in an income deficit for the first five months of 1921 of approximately $1,650,000, as against a surplus (taking into consideration only the comparable items) of about $1,000,000 for the corresponding period of 1920. The actual net income of your Company for this period of 1920, by reason of the compensation payable under your contract with the Director General of Railroads was over $1,400,000, so that your Company was actualy at least $3,000,000 worse off during these five months than it was in the corresponding period of the previous year. This represented nearly 5% on the total outstanding capital stock. During May, 1921, your Company had on hand over $7,000,000 in unpaid vouchers past due for sixty days or more. Under these circumstances your directors deemed it advisable at their May meeting, in order to conserve your cash resources, to omit the declaration of a dividend payable in June. As a result of the efforts made to reduce expenditures for operations (including a substantial reduction in the salaries of the higher officials) and increased efficiency of employees resulting from a better labor supply due to depression in general business, together with reduction in wages ordered by the United States Railroad Labor Board effective July 1st, 1921, and reduction in expenditures for Additions and Betterments to the lowest point consistent with safety of operation and reasonably satisfactory service, accompanied by some improvement in the volume of traffic, a better showing was made during the last six months of the year and the customary dividend of 2% was declared in November payable January 3rd, 1922. The directors of your Company are keenly alive to the hardship to many of its stockholders resulting from any interruption in the regular payment of dividends, and the deferring of the dividend which would ordinarily have been paid in June was due only to their conviction that its payment at that time would have interefered with the ability of the Company to meet promptly and adequately its obligations to its creditors and to the public. The period of deflation through which your Company, in common with the industries of the country generally has been passing, has involved the necessity of substantial sacrifice by many, including the employees and the officers as well as the stockholders of your Company.

Your directors think it proper to point out the fact that there is sometimes a misapprehension as to the significance of an income statement which indicates a given percentage earned upon outstanding capital stock. The balance of income after payment of fixed charges of your Company, for example, constitutes a fund out of which must be paid not only dividends to its stockholders but also certain other obligations, notably sinking funds on outstanding bond issues and principal payments accruing on maturing equipment trusts. Payments of this character by your Company during 1921 aggregated $1,968,270, an amount equal to approximately 3% upon your Company's capital stock. Provision must also be made out of income for certain of the less productive additions and betterments from time to time required to be made. Amounts thus expended accrue to the benefit of the stockholders in the form of additions to the Company's permanent investment, but the portion of the surplus of the Company that is so invested is, of course, not available for dividends

In common with other companies your Company is seeking further readjustments in its labor costs where these are out of line with those prevailing in other industries. Reductions in wages, however, are naturally not accepted readily by your employees and the matter must ultimately be settled by decision of the United States Railroad Labor Board, which cannot be expected for some months. On the other hand there is insistent pressure by shippers for a reduction in freight and passenger rates, many of which have already become effective as a result of orders of the Interstate Commerce Commission. Should the Commission be forced by pressure brought to bear upon it to order further substantial reductions, before your Company can reduce its present operating costs, the improvement now in progress in your Company's financial condition is likely to be considerably interfered with.

Pursuant to authority previously given by the stockholders and after approval by the Interstate Commerce Commission upon due application, the properties of The Chesapeake and Ohio Northern Railway Company were, effective December 1, 1921, conveyed to your Company and the properties of The Chesapeake and Ohio Railway Company of Indiana were, effective January 1, 1922, leased to your Company for nine hundred and ninety-nine years. As a condition of the conveyance by The Chesapeake and Ohio Northern Railway Company your Company assumed direct liability for $1,000,000 first mortgage 5% bonds of that Company, and these bonds appear upon the balance sheet, page 17.

During the year the line and grade revision on the Coal River District between St. Albans and Ferrell, a distance of 4.2 miles, was completed and put in operation. This revision gives a maximum of .2 per cent compensated grade against the westbound or loaded traffic and a .5 per cent compensated grade against eastbound or empty traffic and permits of the use of heaviest equipment on this District, due to the elimination of a tunnel of small section.

Second track on the Logan Division was completed and put in operation between Clover Valley and Salt Rock, a distance of 9.6 miles, and between Big Creek and Pecks Mill, a distance of 9.7 miles, which makes a continuous stretch of second track on this Division between Barboursville and West Hamlin of 18 miles, and Big Creek and Peach Creek Terminal 14.4 miles, leaving a single track section between West Hamlin and Big Creek of 31 miles.

The Hazy Creek Branch extending from Edwight up Hazy Creek of Coal River about 1.8 miles, was constructed by the Rowland Land Company, taken over by the Railway Company and put in operation.

At Gladstone, Va., the eastbound yard, consisting of 14 tracks, was extended to hold 90 car trains, and at Hinton, W. Va., the eastbound yard, consisting of 10 tracks, was extended to hold 80 car trains; two additional tracks to hold 100 car trains were constructed at St. Albans, two tracks to hold 80 car trains were constructed at Tram, Ky., three tracks were added to the yard at Ashland, Ky., two tracks were added to the yard at Shelby, Ky., and two tracks were added to the yard at Paintsville, Ky.

Modern shop buildings, consisting of new power plant, 10 stall roundhouse, storeroom, oil house, icehouse and toilet buildings, were constructed at Clifton Forge, Va., rectangular frame engine house to hold two engines was constructed at Raleigh, W. Va., and the frame engine house at Thurmond, W. Va., was extended during the year.

100 foot Turntables at Russell, Ky., and Peach Creek, W. Va., 85 foot turntables at Stevens, Ky., and 70 foot turntables at Netherland, Ky., and Clifton Forge, Va., were replaced with new 100 foot twin span turntables, new 100 foot twin span turntable was built at Ashland, Ky., second hand 70 foot turntable was installed at Paint Creek Junction, W. Va., in addition to which the existing 100 foot turntables at Fulton, Va., Ronceverte, W. Va., and Cheviot, Ohio, were strengthened.

Interlocking Plant was constructed during the year at Big Sandy Junction, Ky., the junction of Big Sandy Division with the main line.

During the year bridge 02 at Bremo, Va., was replaced with heavier bridge; at Bridgetown, Ohio, trestle over Cleves and Bridgetown Pike was renewed with steel bridge, and three trestles on Chicago Division were filled.

Water Softening Plants were constructed at Russell, Ky., Concord, Ky., and Stevens, Ky.

New Freight Depot was built at Logan, W. Va., and small depots were constructed during the year at Hilton Village, Va., Atlee, Va., and Sweetser, Ind.

Additional fire protection was installed at 17th Street, Richmond, Va., for protection of shop properties.

There are now under construction at Peach Creek, W. Va., 5 additional yard tracks and engine dispatching tracks, which work should be completed during the year of 1922.

The three channel spans of Licking River Bridge at Covington, Ky., are being replaced with heavier span, which work should be completed during the year of 1922.

New Passenger Stations are now in process of construction at Covington, Ky., and Logan, W. Va., which should be completed during the year of 1922. New Westbound Yard, consisting of seven 100 car tracks, is now under construction at Gladstone, Va., which work should be completed during the year of 1922.

Automatic Train Control System is being installed between Charlottesville, Va., and Staunton, Va., a distance of about 40 miles, which work should be completed this year, and when completed will give a continuous section of automatic train control from Gordonsville, Va., to Staunton, Va., a distance of about 61 miles.

Among the new local industries were the following:

25 manufacturers of farm implements and farm products.
13 manufacturers of lumber and lumber products.
31 manufacturers of mineral, metal and other products.
42 new coal mines.

Your directors again acknowledge with appreciation the faithful and effi- H. Davis, a director of your Company since 1909, and Vice-President from July 1, 1918, to the time of his death. Appropriate resolutions of regret and appreciation were adopted by your directors with reference to his death.

Effective June 17th, 1921, Mr. W. J. Louderback was elected a director of your Company to succeed Mr. Davis.

Your directors again acknowledge with appreciation the faithful and e.. cient service of your officers and employees.

By order of the Board of Directors,

H. E. HUNTINGTON, Chairman. W. J. HARAHAN, President.

[ADVERTISEMENT]

Twenty-third Annual Report of The Hocking Valley Railway Company

Columbus, Ohio, May 18, 1922.

To the Stockholders:

The Twenty-Third Annual Report of the Board of Directors, for the fiscal year ended December 31, 1921, is herewith submitted.

The average mileage operated during the year was 350.1 miles, a decrease compared with previous year of .1 miles. The mileage at end of the year was 350.1 miles.

RESULTS FOR THE YEAR.

Operating Revenues	$14,093,001.38
(Decrease $3,008,491.78 or 17.59%.)	
Operating Expenses	11,572,394.38
(Decrease $4,369,040.19 or 27.41%.)	
Net Operating Revenue	$2,520,607.00
(Increase $1,360,548.41 or 117.28%.)	

Taxes and Uncollectible Railway Revenue	812,062.36
(Decrease $159,196.87 or 16.39%)	
Railway Operating Income	$1,708,544.64
(Increase $1,519,745.28 or 804.95%.)	
Net Equipment and Joint Facility Rents	*(Dr.) 147,803.38*
(Decrease $1,536,967.12 or 110.64%)	
Net Railway Operating Income (Corporate)	$1,560,741.26
(Decrease $277,725.45 or 15.11%.)	
Other Income	256,088.59
(Decrease $46,333.95 or 15.32%.)	
Total Gross Income	$1,816,829.85
(Decrease $324,059.40 or 15.14%.)	
Rentals and Other Payments	79,200.94
(Increase $17,753.52 or 28.89%.)	
Income for the year available for interest	$1,737,628.91
(Decrease $341,812.92 or 16.44%.)	
Interest (99.18% of amount available)	1,723,322.63
(Decrease $10,323.39 or 0.60%.)	
Net Income for the year	$14,306.28
(Decrease $331,489.53 or 95.86%.)	

RETURN ON PROPERTY.

The following table shows the amount of return to your Company, from transportation operations only, upon its investment in road and equipment at the termination of each year of the five year period ended December 31, 1921. The road having been operated in 1918, 1919 and January and February, 1920, by the United States Railroad Administration, the Compensation payable by the Government has been used for those years and for January and February, 1920, in lieu of the operating and other items corresponding therewith:

Year Ended December 31:	Property Investment.	Total Operating Income (including hire of equipment and other items).	Per Cent. of Return.
1921	$54,329,923.35	$1,532,557.63	2.82
1920	53,356,347.92	1,802,110.54	3.38
1919	49,036,318.18	2,425,691.11	4.95
1918	48,057,539.03	2,598,474.64	5.41
1917	46,237,480.24	3,060,174.97	6.62
Average	$50,203,521.74	$2,283,801.78	4.55

FINANCIAL.

The changes in funded debt shown by balance sheet of December 31, 1921, as compared with December 31, 1920, consisted in the payment of $369,000 on equipment trusts; and in the addition of (a) the issue of $24,000 additional face amount of equipment obligations under Equipment Trust No. 32, and (b) $1,053,000 face amount of Ten-Year Six Per Cent. Collateral Notes (secured by $1,404,000 face amount of Six Per Cent. General Mortgage Bonds, Series A, held by the Secretary of the Treasury as collateral), being the portion received this year of the loan of $1,665,000 authorized by the Interstate Commerce Commission under the provisions of Section 210 of the Transportation Act, to which reference was made in the Annual Report for 1920. It is expected that the balance of the latter loan, $612,000, will be received before July 1, 1922, and that the additions and betterments toward the cost of which the proceeds of the loan have been appropriated will be completed or contracted for by that date.

Additions and betterments were made during the year to the net amount of $970,959.75 of which $770,641.87 was added to cost of road, and $200,317.88 was added to cost of equipment.

During the past thirteen years your Company's net addition to property accounts has been as follows:

Equipment	$7,976,513.59
Additions and Betterments	8,063,489.59
	$16,040,003.18

GENERAL REMARKS.

The equipment in service December 31, 1921, consisted of:

Locomotives owned	123	No change	
Locomotives leased under equipment trusts	28	No change	
Locomotives held under other form of title	10	No change	
Total	161	No change	
Passenger train cars owned	72	No change	
Freight train and miscellaneous cars owned	12,767	Decrease	52
Freight train cars leased under equipment trusts	2,498	No change	
Freight train cars under special trust	47	No change	
Total freight train and miscellaneous cars	15,312	Decrease	52

The changes during the year in accrued depreciation of equipment account were as follows:

Balance to credit of account December 31, 1920		$3,557,857.08
Amount credited during year ended December 31, 1921, by charges to U. S. Government	$87.37	
Amount credited by charges to operating expenses	482,168.54	
	$482,255.91	
Charges to account, for:		
Accrued depreciation on equipment retired during year—54 freight and work cars	$9,481.80	
Accrued depreciation on cars changed in class during year	340.27	
	9,822.07	
	472,433.84	
Balance to credit of account December 31, 1921		$4,030,290.92

The second track between Marion and Morral, which was reported as well under way in 1920, was completed during the year. The new track constructed, together with the sidings absorbed, added 8.64 miles to the second track in operation. The section of second track between Columbus and Ackerman was extended .21 miles.

Approximately 1.27 miles of yard tracks at Toledo Dock, 3.02 miles of yard tracks at Wallbridge and 1.05 miles of yard tracks at Parsons were completed and placed in service. The tracks constructed in Parsons Yard included extension of North inbound engine tracks to facilitate movement between enginehouse and fuel station. A new lead to Parsons enginehouse from Mosel, a distance of approximately one mile, is well under way. Approximately 1.99 miles additional siding at Carey, .54 miles at Upper Sandusky, and 1.05 miles at Marion, and a second interchange track with the N. Y. C. & St. L. R. R. at Fostoria were completed and placed in service.

An old wooden trestle, 16 feet long, at Carroll, which was of insufficient length to afford adequate waterway, was replaced by a new steel girder bridge, 33 feet long, with ballast floor.

The coal crushing plants in connection with the fuel stations at Walbridge, Carey, Parsons and Nelsonville, and the new track scales at Nelsonville and New Straitsville, which were reported as well under way in 1920, were completed. The 60 ft. turntable at Pomeroy, which was inadequate for handling the heavy locomotives now used on the River Division, was replaced by a 75 ft. table released at Walbridge several years ago when a 100 ft. table was installed at that point. A new wooden water tank 70,000 gallons capacity, with steel supports, was constructed at Dundas.

The revenue coal and coke tonnage was 10,798,493 tons, a decrease of 7.6%; other revenue freight tonnage was 1,994,682 tons, a decrease of 44.5%. Total revenue tonnage was 12,793,175 tons, a decrease of 16.3%. Freight revenue was $11,924,979.21, a decrease of 18.4%. Freight train mileage was 1,067,437 miles, a decrease of 18.0%. Revenue ton miles were 1,570,395,171, a decrease of 20.4%. Ton mile revenue was 7.59 mills, an increase of 2.6%. Revenue per train mile was $11.17.1, a decrease of .5%. Revenue tonnage per train mile was 1,471 tons, a decrease of 3.0%; including Company's freight, the tonnage per train mile was 1,502 tons, a decrease of 2.7%. Tonnage per locomotive, including Company's freight, was 1,267 tons, a decrease of 1.8%. Revenue tonnage per loaded car was 45.5 tons, a decrease of 1.9%. Tons of revenue freight carried one mile per mile of road were 4,485,562, a decrease of 20.4%.

There were 1,022,177 passengers carried, a decrease of 26.0%. The number of passengers carried one mile was 37,370,739, a decrease of 21.6%. Passenger revenue was $1,270,021.29, a decrease of 6.6%. Revenue per passenger per mile was 3.898 cents, an increase of 19.1%. The number of passengers carried one mile per mile of road was 106,743, a decrease of 21.5%. Passenger train mileage was 620,394, a decrease of 0.4%. Passenger revenue per train mile was $2.04.7, a decrease of 6.2%; including mail and express it was $2.32.1, a decrease of 9.0%. Passenger service train revenue per train mile was $2.39.8, a decrease of 9.6%.

There were 7,021 tons of new 100-lb. rails and 3 tons of new 90-lb. rails, equal to 44.7 track miles, used in the renewal of existing main tracks.

The average amount expended for repairs per locomotive was $5,468.73, a decrease of 35.4%; per passenger train car $1,099.89, a decrease of 45.9%; per freight train car $176.85, a decrease of 39.0%.

Due to the complexity of the accounts involved and the necessity of carefully checking an enormous number of items, it has not yet been practicable for your Company to secure a final settlement with the Director General of Railroads for the period of Federal control or with the Interstate Commerce Commission for the so-called Guaranty Period, March 1 to September 1, 1920. Your directors and officers are making every effort to reach a conclusion of these matters as promptly as possible and are receiving the cordial cooperation of the Government authorities. As the amount of any settlement on either of these accounts is still impossible of ascertainment no accrual in respect thereof has as yet been included in your income account.

In the Annual Report for 1920 reference was made to the substantial falling off in the volume of business subsequent to January 1, 1921, and the probability of a resulting unsatisfactory showing for the year 1921. The condition forecasted in the Annual Report continued throughout the year with the result that, notwithstanding the increase of about 40% in your Company's average freight rates effective in the summer of 1920, the gross earnings of your property were less by more than $3,000,000 than during the year 1920. Meanwhile, though some reductions in wages were effected as a result of decisions of the United States Labor Board, most of the heavy operating costs resulting from war conditions including the working rules established by Governmental authority and a still excessive labor cost, continued, and your Company was unable, notwithstanding drastic reduction of working forces, a general reduction in official salaries and curtailing of purchases wherever possible, to wholly avoid the effect of the falling off of business.

These conditions, together with the fact that your Company enjoyed for the first two months of 1920 the compensation payable under your contract with the Director General of Railroads, resulted in the reduction of the net income of your Company revealed on page 3 of this report. Under these circumstances your directors deemed it advisable at their May meeting, in order to conserve your cash resources, not to declare a dividend payable in June. The customary dividend of two per cent, payable December 31, 1921, was declared in November, and was substantially all paid out of the accumulated surplus of your Company, the income for the year being insufficient therefor. The directors of your Company are keenly alive to the hardship to many of its stockholders resulting from any interruption in the regular payment of dividends, and the deferring of the dividend which would ordinarily have been paid in June was due only to their conviction that its payment at that time would have interfered with the ability of the Company to meet promptly and adequately its obligations to its creditors and to the public. The period of deflation through which your Company, in common with the industries of the country generally has been passing, has involved the necessity of substantial sacrifice by many, including the employees and the officers as well as the stockholders of your Company.

In common with other companies your Company is seeking further readjustments in its labor costs where these are out of line with those prevailing in other industries. Reductions in wages, however, are naturally not accepted readily by your employees and the matter must ultimately be settled by decision of the United States Railroad Labor Board, which cannot be expected for some months. On the other hand there is insistent pressure by shippers and patrons for a reduction in freight and passenger rates, some of which have already become effective as a result of orders of the Interstate Commerce Commission. Should the Commission be forced by pressure brought to bear upon it to order further substantial reductions, before your Company can reduce its present operating costs, improvement in your Company's financial condition is likely to be considerably interfered with.

Your directors regret to announce the death, on May 2, 1921, of Mr. Frank H. Davis, a director of your Company since 1909, and Vice-President from July 1, 1918, to the time of his death. Appropriate resolutions of regret and appreciation were adopted by your directors with reference to his death. On June 16, 1921, Mr. Garrett B. Wall, Vice-President of your Company, was elected director to succeed Mr. Davis.

During the year Messrs. Samuel P. Bush and Frederick J. Reynolds, directors of your Company, resigned. Their resignations were accepted with regret. Messrs. John Galvin and William N. Cott were elected to succeed them.

Appreciative acknowledgment is hereby made to officers and employees for their efficient service during the year.

By order of the Board of Directors:

H. E. HUNTINGTON, Chairman. W. J. HARAHAN, President.

[Advertisement]

Railway Officers

Executive

R. S. Marshall, has been appointed assistant to the president of the Chesapeake & Ohio and the Hocking Valley, with headquarters at Richmond, Va., effective June 15, succeeding C. S. Lake, resigned.

Winfield S. Haines, master mechanic of the Hornell Region of the Erie at Dunmore, Pa., has been appointed assistant to the vice-president in charge of operation, with headquarters at New York, effective June 15.

Operating

E. Stroud has been appointed trainmaster of the Southern Pacific, Portland division, with headquarters at Eugene, Ore., effective June 13.

R. E. Titus has been promoted to assistant superintendent of the Idaho division of the Oregon Short Line, with headquarters at Nampa, Idaho, effective June 25, to succeed **R. A. Brooks** promoted to superintendent of the Montana division, with headquarters at Pocatello, Idaho. He succeeds **C. E. Brooks** transferred to the Utah division with the same headquarters in place of R. A. Pierce.

Lynne L. White, whose promotion to superintendent of the Chicago division of the Erie, with headquarters at Chicago, effective June 10, was reported in the *Railway Age* of June 17, page 1514, was born on July 2, 1889, at Kenwood Park, Iowa, and entered railway service on March 10, 1904, as a file clerk in the office of the division passenger agent of the Chicago, Rock Island & Pacific at Cedar Rapids, Iowa. Thereafter, excepting for the period from December 1, 1905, to April 1, 1906, when he attended business college, he was employed in various stenographic and clerical capacities in passenger and division operating offices on the Chicago, Rock Island & Pacific at Cedar Rapids, Iowa, and Esterville, until June 1, 1907, when he entered the employ of the St. Louis-San Francisco, as stenographer and clerk for the division superintendent at Enid, Okla. He re-entered the service of the Chicago, Rock Island & Pacific, on November 5, 1907, as stenographer and clerk in the division superintendent's office at Cedar Rapids, Iowa, and from that time served consecutively as stenographer and clerk at Cedar Rapids, Iowa, from November 5, 1907, to March 1, 1909; as secretary to the division superintendent and later to the general superintendent at Cedar Rapids from March 1, 1909, to November 20, 1911; as clerk in the office of the general superintendent at Davenport, Iowa, from November 20, 1911, to May 15, 1912; as secretary to the general manager at Des Moines, Iowa, thereafter until February 28, 1913, and as chief clerk in the division office, and for a portion of the time night chief dispatcher at Manly, Iowa, thereafter until February 16, 1918, when he entered the employ of the Erie, holding the position of chief of the several regional offices in Chicago until October 1, 1920, when he was promoted to trainmaster of the Hammond division, with headquarters at Hammond, Ind., the position he held at the time of his recent promotion.

L. L. White

Robert E. Ryan, whose promotion to general manager of the Minneapolis & St. Louis with headquarters at Minneapolis, Minn., effective June 15, to succeed Elliot E. Nash resigned to accept service with another company, was reported in the *Railway Age* of June 17, page 51, was born September 18, 1872, in Newbern, N. C., and commenced his business career as a telegraph operator in the employ of the Western Union, serving in that position at St. Louis, Kansas City, Mobile and New Orleans for eight years thereafter. He entered railway service in 1894 as an operator on the St. Louis, Iron Mountain & Southern. He continued with that road as operator and agent at various stations on the Arkansas division for several years, following which he served as trainmaster at Poplar Bluff, Mo., and Little Rock, Ark. On November 1, 1908, he became trainmaster on the Iowa Central, now part of the Minneapolis & St. Louis, at Marshalltown, Ia. Two years later, he was promoted to assistant superintendent of the Minneapolis & St. Louis at Watertown, S. D., and on September 1, 1917, was advanced to superintendent of the Central and Western divisions with headquarters at Minneapolis, holding this position until his recent promotion to general manager.

R. E. Ryan

Financial, Legal and Accounting

D. J. Bond, assistant comptroller, has been appointed comptroller of the Minneapolis, St. Paul & Sault Ste. Marie, effective June 15, succeeding C. W. Gardner, retired.

Lewis A. Bell, whose promotion to comptroller of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, effective May 23, was reported in the *Railway Age* of June 3, page 1317, was born on September 20, 1875, at Toledo, Ohio, and entered railway service September, 1891, as telegraph operator on the New York, Chicago & St. Louis. After serving as telegraph operator and station agent from September, 1891, to August, 1899, he entered the employ of the Chicago Junction, where he served consecutively as freight claim investigator, traveling auditor and chief clerk to the auditor until November, 1908, when he was appointed examiner of accounts for the Interstate Commerce Commission. A few years later he was placed in charge of the Chicago office of this department of the commission where he also completed a course of study in law at Chicago Kent College in 1913 and was admitted to law practice in 1916. He was subsequently advanced to assistant chief examiner of accounts, a position he held at Chicago and later at Washington until October, 1918, when he was placed in charge of the Washington office and the several branch offices throughout the country, giving attention to the commission's certification of the carriers standard returns and

L. A. Bell

acting also as referee in the merchants' and miners' and the Ulster & Delaware cases. He re-entered railway service June 15, 1920, as auditor on the New York, Chicago & St. Louis and continued in this capacity until May 10, 1922, when he was appointed comptroller of the Lake Erie & Western, with headquarters at Cleveland, Ohio, the position he held at the time of his recent promotion.

T. Broom, secretary of the Chicago Junction, has resigned to become treasurer of the syndicate, which is to construct the new Union Stock Yards in Los Angeles, Cal., of which **J. A. Spoor, A. J. Leonard** and **H. E. Poronto** will constitute the managing board.

Henry S. Mitchell, whose election as general counsel of the Minneapolis, St. Paul & Sault Ste Marie, with headquarters at Minneapolis, Minn., to succeed H. B. Dike retired, was reported in the *Railway Age* of June 10, page 1326, was born at Milwaukee, Wis., in 1882, studied at the University of Minnesota, from 1901 to 1905, and was educated in law at Oxford University, England, from which he was graduated in 1908. Subsequently, he was employed as an instructor in the law school of the University of Minnesota until 1910, when he engaged upon the practice of law in Minneapolis. He relinquished this work four years later to become special assistant to the attorney general of the United States at Washington, D. C., where he remained until 1921, when he was appointed advisory counsel with headquarters in New York city, in which capacity he represented the government during the following year. He entered railway service on January 19, 1922, as assistant general counsel of the Minneapolis, St. Paul & Sault Ste Marie, with headquarters at Minneapolis, Minn., and continued in this capacity until June 1, 1922, the date of his election as general counsel to succeed Mr. Dike.

H. S. Mitchell

Engineering, Maintenance of Way and Signaling

G. W. Hegel, chief engineer of the Chicago Junction, with headquarters at Chicago, has resigned to go to Los Angeles, Cal., where he will have charge of an important construction enterprise in connection with new stock yards, connected with the Union Pacific.

H. N. Huntsman, assistant engineer of the Wabash with headquarters at Montpelier, Ohio, has been promoted to division engineer of the St. Louis Terminals, with headquarters at St. Louis, Mo., effective June 15, to succeed **J. T. Vitt,** who is transferred to the Springfield division with headquarters at Springfield, Ill., to succeed Edward Shelah, promoted to the newly-created position of inspector of maintenance.

Traffic

S. A. Campbell has been appointed division freight agent of the Norfolk & Western, with headquarters at Winston-Salem, N. C., succeeding F. W. Jones, promoted.

F. D. Hammer, assistant general passenger agent of the Wabash, with headquarters at St. Louis, Mo., has been transferred temporarily to Detroit, Mich., effective June 5.

R. A. Bishop, general agent, freight traffic, of the Chicago Great Western, has been appointed division freight and passenger agent at Red Wing, Minn., effective June 1.

A. W. Nelson, traveling freight agent on the Chicago Great Western, with headquarters at St. Louis, Mo., has been promoted to general agent to take charge of the newly established agency at St. Louis, Mo.

Paul P. Hastings, whose appointment to the newly created position of general freight agent of the Atchison, Topeka & Santa Fe, with headquarters at San Francisco, Cal., was reported in the *Railway Age* of May 27, page 1263, was born at Farmington, Kan., October 22, 1872, and attended the National Business College at Kansas City, Mo. He entered railway service in August, 1891, as an employee on the Atchison, Topeka & Santa Fe and served as freight clerk at Phoenix, Ariz., from April 1, 1895, to December 1, 1898, when he left railway service to become traffic manager of the United Verde Copper Company at Jerome, Ariz., where he remained until September 1, 1900. Beginning October 1, 1900, he was engaged as auditor and general freight and passenger agent of the United Verde & Pacific Railway with headquarters at Jerome, Ariz., until December, 1902, when he became associated with mining interests in southern Arizona and Mexico. He re-entered railway service as auditor on the Atchison, Topeka & Santa Fe at Prescott, Ariz., in April, 1903, following which he served as auditor at Prescott until March, 1907, as general freight and passenger agent with the same headquarters until June, 1912, and thereafter as assistant general freight agent with headquarters at San Francisco, until February, 1908, when he became assistant to director of traffic of the United States Railroad Administration with headquarters at Washington, D. C., in charge of the freight rate department. Thereafter he continued as assistant to the director of traffic until February, 1920, and thence as special traffic assistant, division of law, until January, 1921, when he relinquished his connection with the United States Railroad Administration to become a member of the Standing Rate Committee of the trans-continental freight bureau, with headquarters at Chicago, the position he held at the time of his recent appointment as general freight agent.

Paul Hastings

Purchasing and Stores

W. McMaster, purchasing agent of the Indiana Harbor Belt, with headquarters at Chicago, has been appointed purchasing agent also of the Chicago River & Indiana and the Chicago Junction, with headquarters at Chicago, in which capacity he succeeds S. Salter, heretofore purchasing agent of the Chicago Junction.

Obituary

James Franklin Ingram, retired bridge engineer of the Louisville & Nashville and an employee of that company for 57 years, died in Louisville, Ky., June 9, at the age of 87 years.

C. P. Torrey, superintendent of transportation of the Hocking Valley, with headquarters at Columbus, Ohio, died at his home in that city, June 9, after having been in the service of that company for a period of 30 years.

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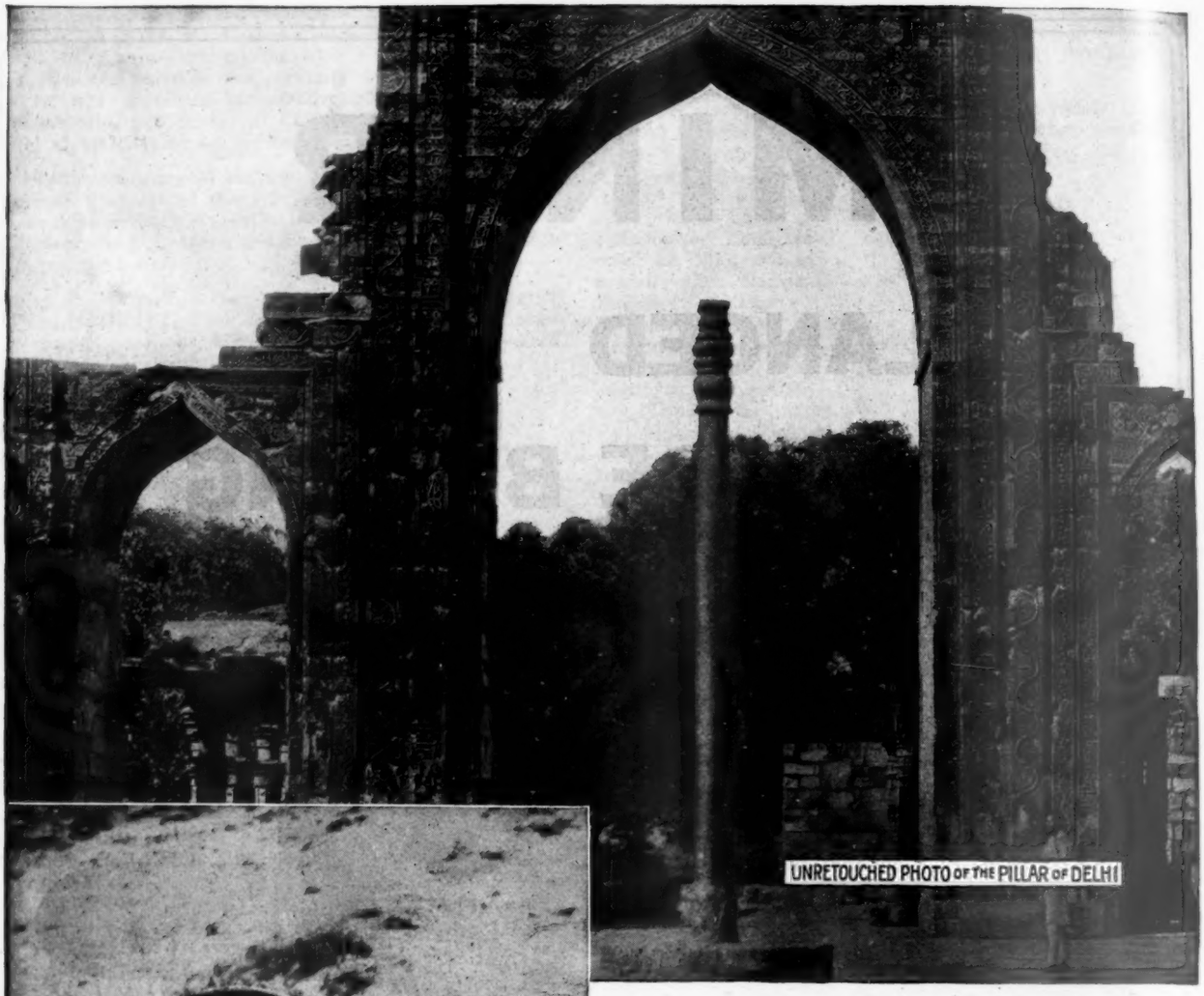

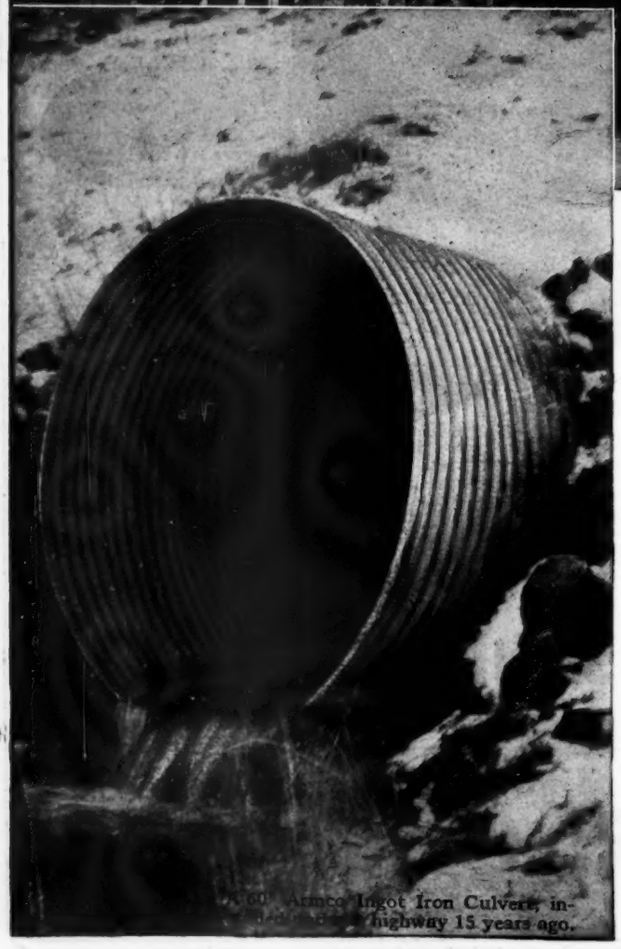
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Railway Age

Vol. 72 June 24, 1922 No. 25

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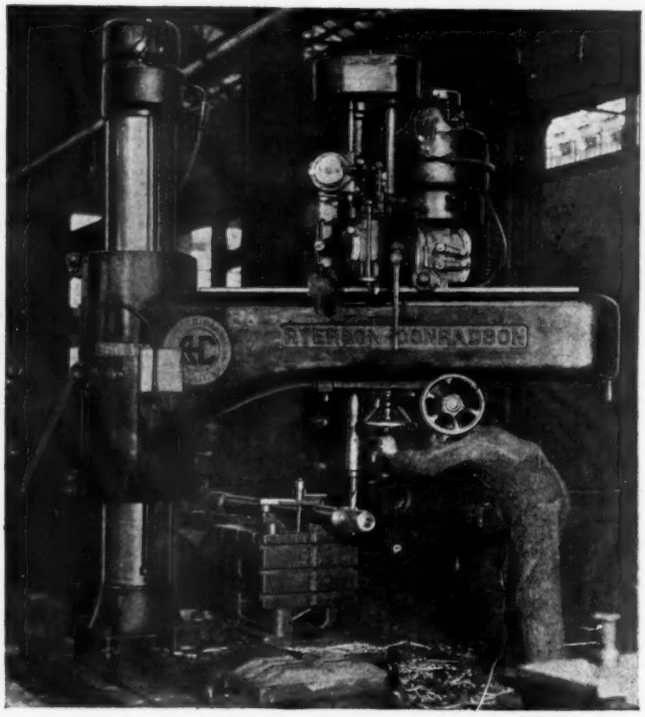

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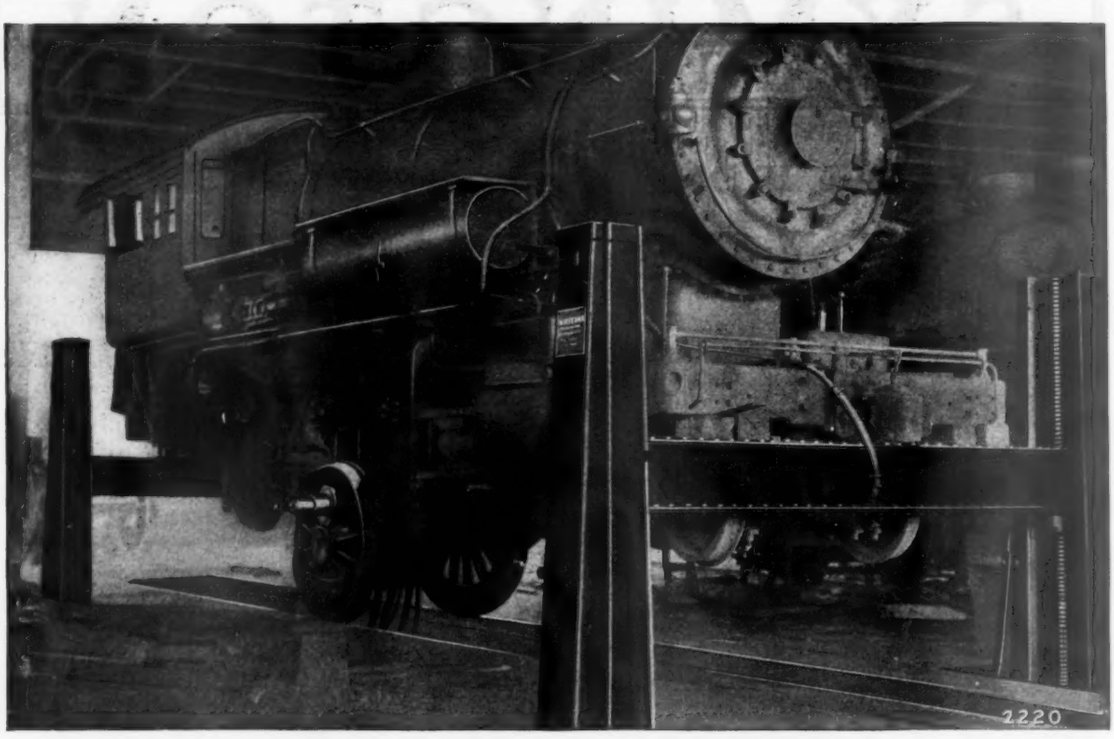

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Maintenance—No specially trained forces are required for maintenance of engine or track equipment. Actual figures from railroad records covering costs of maintenance for five years are obtainable.

Expedition of Traffic—Undesirable stops at unpredetermined points due to the action of the train control system are impossible.

STAUNTON, VA. Miller Train Control DANVILLE, ILL.

CAM
Steel C
FOR FREIGHT SE

MIDVALE STEEL AND C
CAMBRIA STE E

Atlanta
Boston
Chicago
Cincinnati
Cleveland
Detroit
New York

SOLE EXPORTER OF OUR COMMERCIAL PRODUCTS CONSTECO CONSOLIDATED STEEL CORPORATION 25 BROADWAY, NEW YORK, U.S.A.

BRIA
Cars
SERVICE

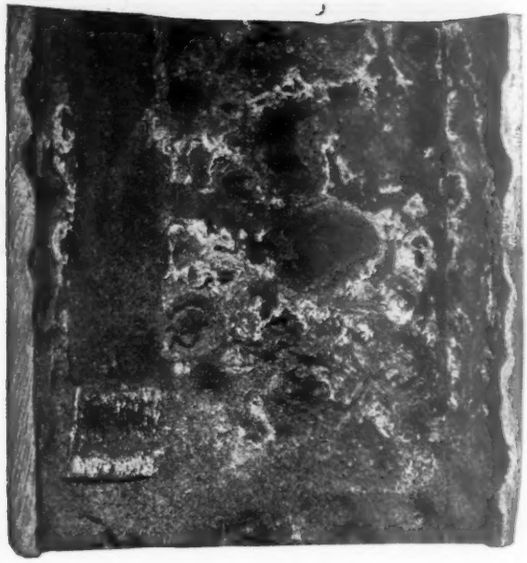
THE illustration shows the first car turned out in the Cambria car shops that is equipped with the new Symington wrought steel side frames.

The new Symington wrought steel side frame is made from a single piece of steel plate in the car shops of the Cambria Steel Company. It has all of the good points of the cast steel frame and at the same time is lighter and stronger. There is also a marked superiority to other types of pressed steel side frames because it is made in one piece and there are no parts to work loose.

ORDNANCE COMPANY
EL COMPANY

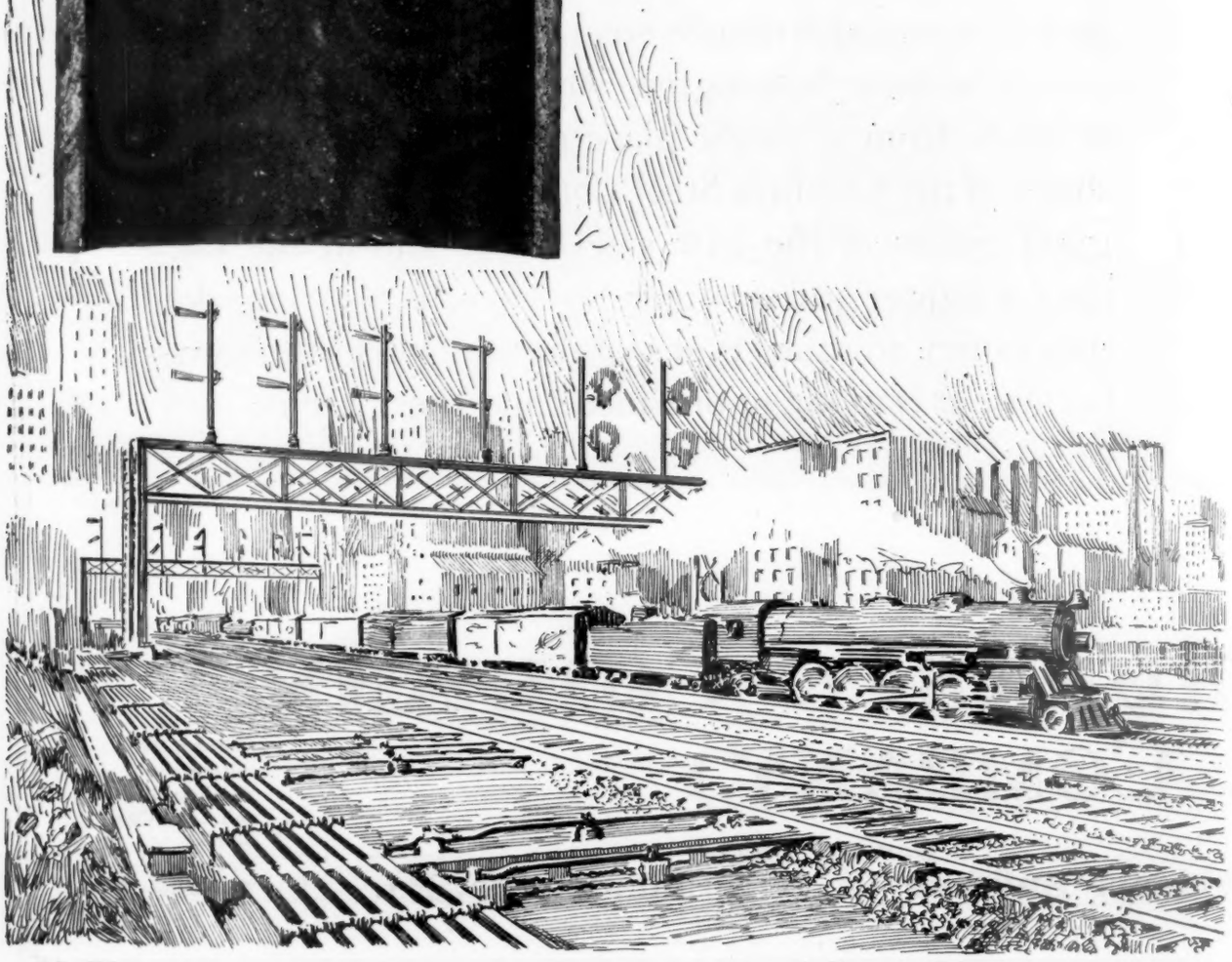
General Offices:
Widener Building Philadelphia, Pa.

Philadelphia
Pittsburgh
San Francisco
Salt Lake City
Seattle
St. Louis
Washington, D. C.



Above
Steel Pipe 8 years in Service

Below
Reading Genuine Wrought Iron Pipe in Service for 22 years



A Camera Shows Why Great Railroads Measure Pipe Value in Terms of Endurance

These unretouched photographs prove conclusively why Reading Wrought Iron Pipe saves thousands of dollars annually for many of America's most highly organized and efficiently conducted railway systems.

Both shipments of pipe *looked* the same when the order was placed. Both were installed with a like amount of labor at the same wage rate, and both were used under similar conditions. Yet the steel pipe is ready for the scrap heap at the end of the eighth year, while the original condition of the Reading Wrought Iron Pipe is practically unchanged after *twenty-two years* of continuous, unfailing service.

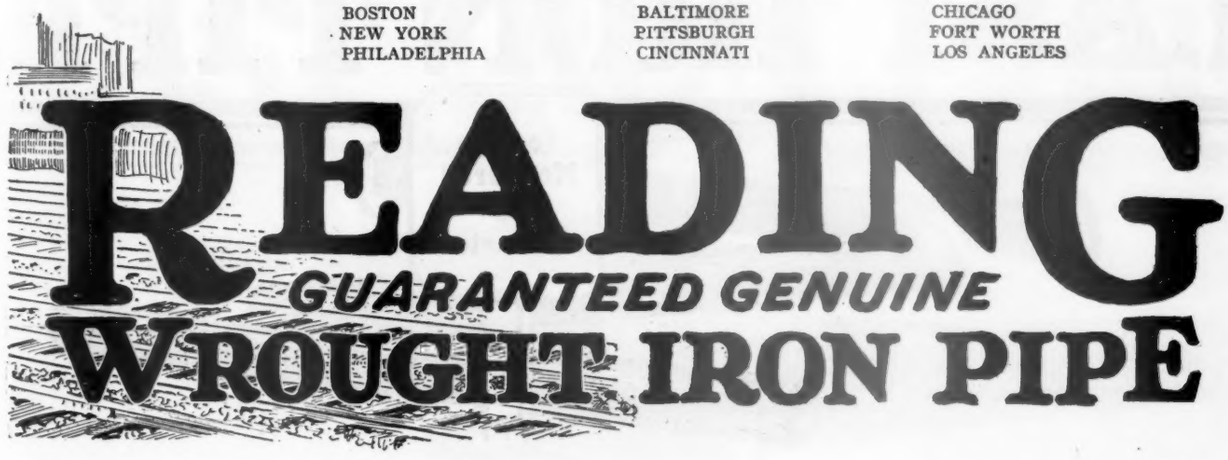
Genuine Reading Wrought Iron Pipe with a life two to three times that of steel—represents the utmost in conservation, safety and operating efficiency in steam, heat, air and ammonia lines. The siliceous slag content keeps it in service years after corrosion has ended the usefulness of pipe which was bought on a basis of price alone. The fibrous structure ensures successful resistance to sudden shocks and strenuous strains that steel cannot withstand. And superior threading qualities mean tight, trustworthy joints.

Sixty-four years ago, the Reading Iron Company began the manufacture of genuine hand-puddled wrought iron pipe and tubing. Since 1849 Reading Wrought Iron Pipe has been the logical choice of those who test pipe side by side and make careful comparisons.

READING IRON COMPANY
Reading, Pa.

Largest Producers of Wrought Iron Pipe in the World

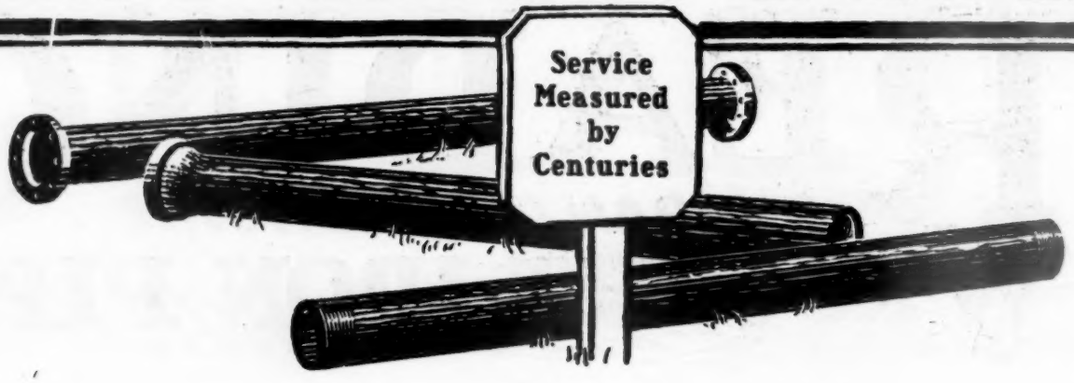
BOSTON
NEW YORK
PHILADELPHIA
BALTIMORE
PITTSBURGH
CINCINNATI
CHICAGO
FORT WORTH
LOS ANGELES



THE FIRST CAST IRON PIPE EVER MADE IN THE WORLD'S HISTORY IS STILL IN SERVICE
SERVICE
CAST IRON PIPE
MEASURED BY
CAST IRON PIPE
CENTURIES
MORE THAN 250 YEARS OLD

"Pipe and the Public Welfare" —an illustrated cloth-bound book, will be sent to any railroad executive who asks for it.

CAST IRON PIPE



Within the Memory of Man Cast Iron has Never been Destroyed by Rust

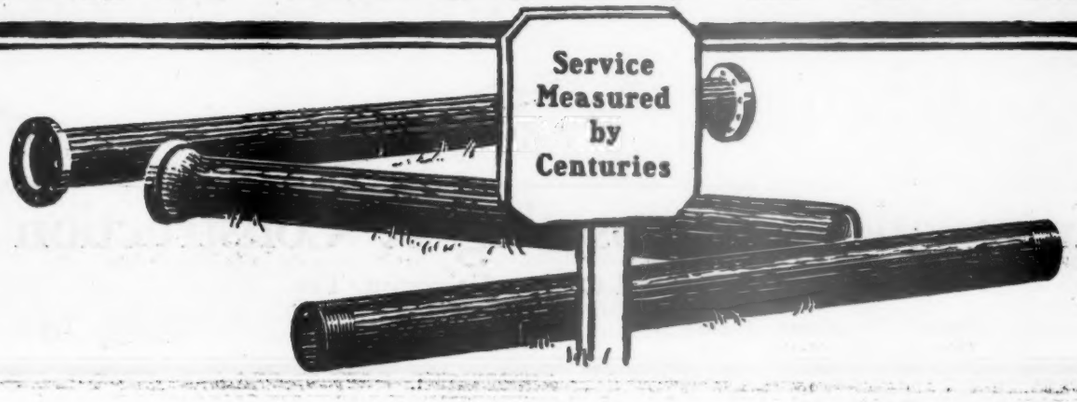
Cast Iron rusts only on the surface. It thus seals itself against further deterioration.

Because the first cost of cast iron pipe is the last, it is the standard pipe for water and gas mains. And its wonderful record in the solution of unusual industrial problems—its resistance to various acids, alkalis, etc.—makes it important for any business executive to know its value.

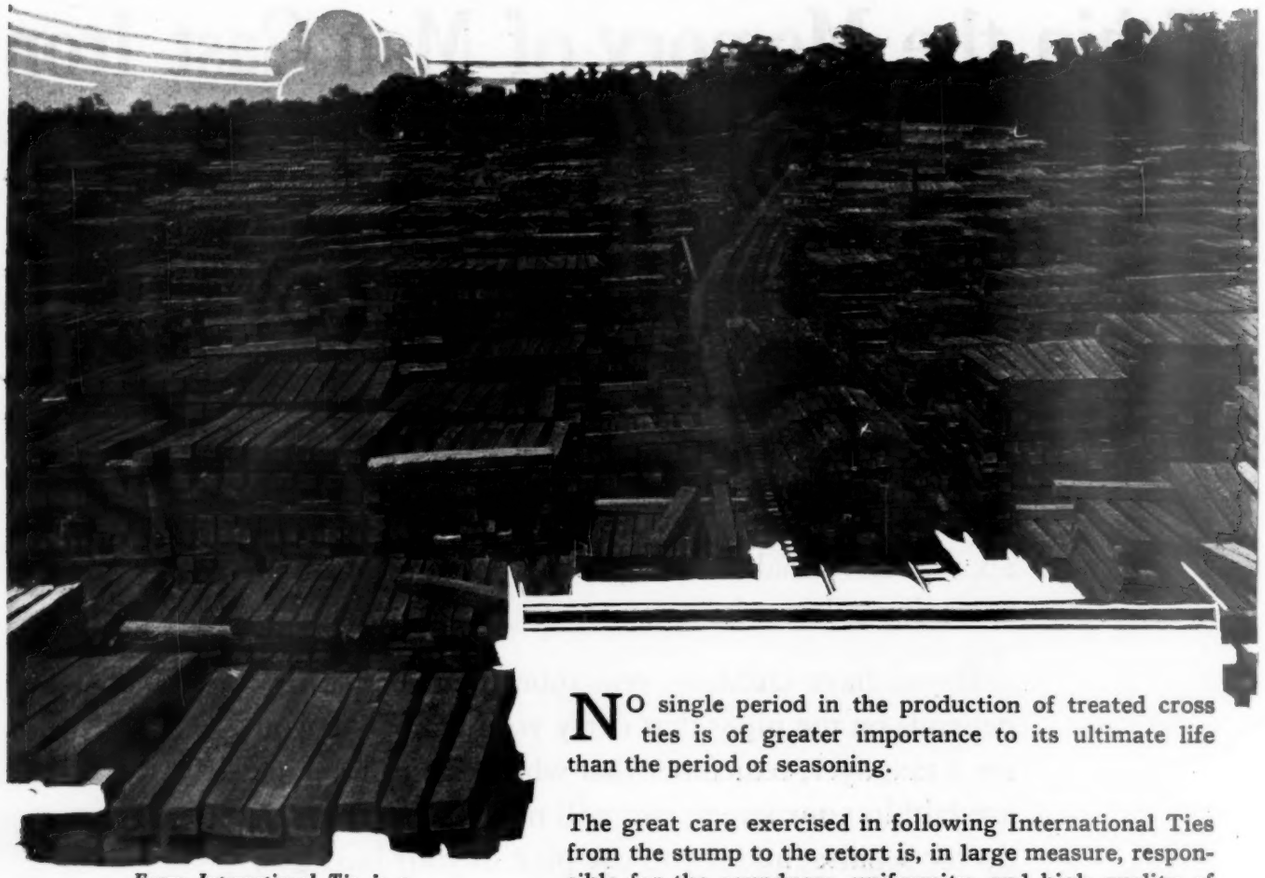
If you have children, remember that their safety depends on the pipes that carry your water. If you are a taxpayer, remember that when cast iron mains are laid in your street, you will never see them torn up for repairs; and if you use pipe in your business, remember that "the service of cast iron pipe is measured by *centuries*."

THE CAST IRON PIPE PUBLICITY BUREAU, ERIE & ST. CLAIR STS., CHICAGO

CAST IRON PIPE



Acres of Graded Ties



Every International Tie is a Sound Tie

NO single period in the production of treated cross ties is of greater importance to its ultimate life than the period of seasoning.

The great care exercised in following International Ties from the stump to the retort is, in large measure, responsible for the soundness, uniformity, and high quality of International Products. The ties are removed quickly from the decay producing conditions of the woods, transported to the railway right of way where they are inspected, graded and shipped quickly to the plant for seasoning.

The one hundred twenty acres of ground, free from all vegetation, and a seasoning capacity of two and a half million ties of our Texarkana Plant is representative of International tie service.

Our methods are adapted to promote early seasoning with minimum danger of decay. All International ties are seasoned under the immediate supervision of trained men who are thoroughly familiar with the characteristics of the timber in this territory.

The tie that lasts longest is least expensive

International Creosoting & Construction Co.

General Office—Galveston, Tex.

Plants: Texarkana, Texas Beaumont, Texas Galveston, Texas

CENTURY

WOOD PRESERVATION

"A SERVICE FOR RAILROADS"

Oak Tie Adzed and Bored

Century Treated Cross Ties

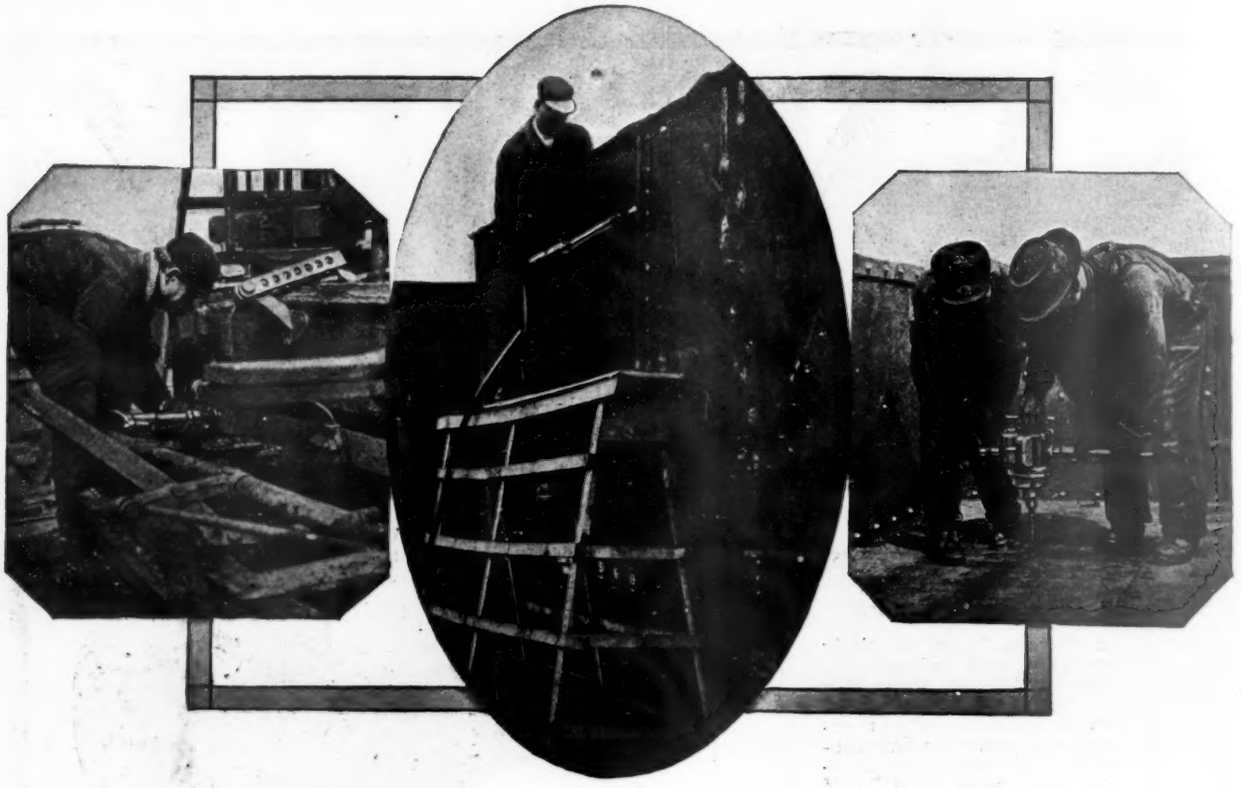
are thoroughly and effectively treated in well designed, conveniently located plants that are equipped for using any of the recognized standard treating processes. Leading railroads in all parts of the country have found CENTURY Treating Service highly satisfactory and very economical.

How can we serve you?

CENTURY WOOD PRESERVING COMPANY

Century Building
Pittsburgh, Penna.

Operating:
Pittsburgh Wood Preserving Company
The Ohio Wood Preserving Co.
Michigan Wood Preserving Co.
Acme Tie Company



Car Building and Repair

In one car shop a man drove an average of 1500 rivets a day for a period of one month with a "Little David" No. 60 Hammer.

"Little David" riveting hammers drive rivets at a fast rate and there are no delays. They do the work more quickly, require little air and have 20% lower average maintenance costs.

"Little David" hammers stand up under hard continuous service.

"Little David" Air Drills for reaming, drilling, etc., are just as durable and efficient. They have 30% less parts in their construction than any similar tool. The simplicity of design avoids complicated parts which would cause troubles and costly repairs.

INGERSOLL-RAND COMPANY, 11 Broadway, New York

Offices in all large cities

Ingersoll-Rand

249-PT

A flood of oil

Reports issued by the U. S. Geological Survey show that approximately 200 million barrels of crude oil are now stored in the United States. But of this vast storage less than 3 per cent consists of the oil classified as "high grade."

The tests and experiments of many years have shown that only the lubricants secured from the high grade crudes are suited by basic strength and vitality to lubricate successfully the rolling stock of railroads. The ordinary grades invariably break down under the strains of the work required.

For over fifty years Galena Oils have given proof of their exceptional quality—of their ability to outwear any other lubricants. They show superior lubricating power by greater mileage and in the protection and preservation of bearing parts. The lessened friction noticeable with their use results in conservation of power—fuel saving.

Galena Oils are the products of specialists, the perfection of exhaustive study and wide experience. Every gallon carries the guarantee of this company to deliver faithful and satisfactory service. Their exceptional records of efficiency on the representative railroads of the United States, Canada, Europe and South America have made them the accepted standard for railway lubrication throughout the world.

"Galena Quality Is Our Bond and Your Security!"

2

Galena-Signal Oil Company

New York - Franklin, Pa. - Chicago

and offices in principal cities

The Romance of Cement

This is the Age of Cement.

Towering skyscrapers, impossible without Cement, house hundreds of thousands of workers.

Great bridges and viaducts of Concrete span rivers and valleys.

Miles and miles of Concrete Highways are flung across the land.

Huge Concrete Dams harness mountain torrents, supplying millions of horse-power to industry.

Portland Cement is not merely pulverized rock; it is a manufactured product requiring numerous distinct and varied mechanical and chemical operations for its production.

Safety requires that it be made properly and put upon the market in perfect condition.

Cement, an almost impalpable powder, when mixed with sand, broken stone, and water, quickly causes the combined materials to become solid Concrete with a hardness like native granite.

Portland Cement manufacturers not only maintain their own laboratories, but through the Portland Cement Association co-operate for the conduct of research and tests requiring extensive laboratories. The results of these studies are placed at the disposal of the public.

Individual companies have their trained staffs of chemists and engineers.

In addition, the industry as represented by these individual companies cooperatively maintains 200 trained engineers in different parts of the country, to show the public how to use Cement most economically and efficiently.

The aim of the industry is to provide a product meeting the highest possible requirements, and to place at the service of the public its nation-wide facilities for furthering building and industrial activities.

PORTLAND CEMENT ASSOCIATION
111 West Washington Street
CHICAGO

TO FURTHER THE INTERESTS OF CEMENT USERS

TEXACO
PETROLEUM
PRODUCTS

RAILROAD·LUBRICATION

Who lubricates this road?

On the "A" Division of 489 miles, 170 Red Ball Fast Perishable trains were handled during May, 1922, of which number 168 were on time, or 98%.

On the "B" Division of 422 miles, they had two hot boxes in May, both of which were on foreign cars.

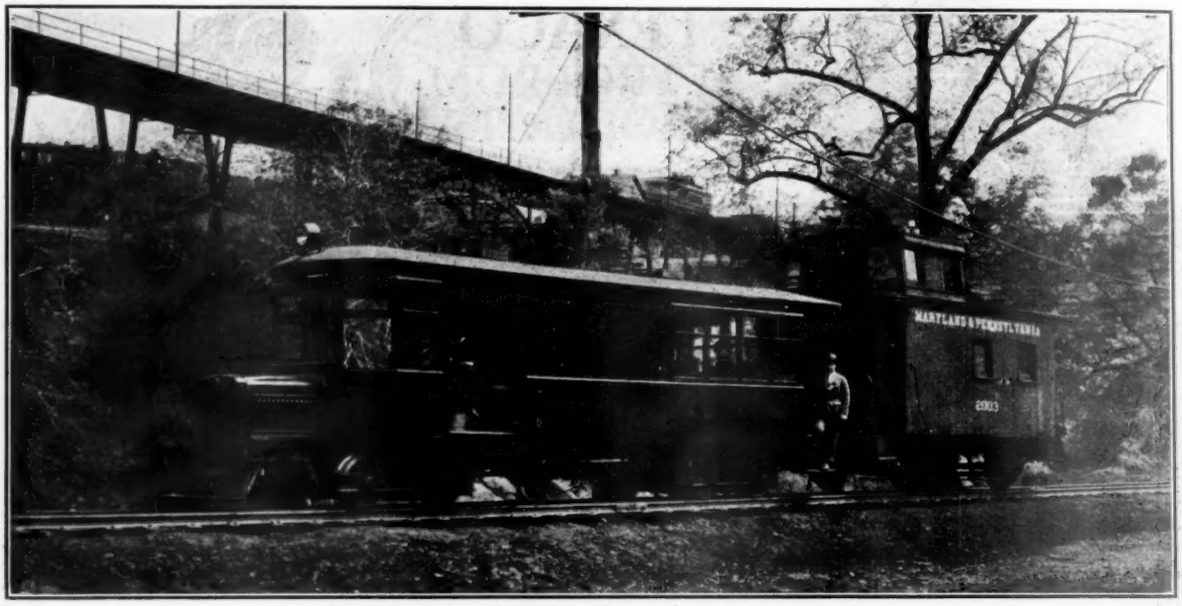
On the "A" Division they handled 28,771 loads and 14,104 empties, total 42,875 cars during month of May—no hot boxes.

On the "A" Division 622 passenger trains were operated during May, 94.4% of which were on time.

This line uses

The Best Railway Lubricants and Service

THE TEXAS COMPANY
RAILWAY TRAFFIC & SALES DEPARTMENT
New York Chicago Atlanta Houston
St. Louis, New Orleans, Dallas, Cleveland, Los Angeles, St. Paul
THERE IS A TEXACO LUBRICANT FOR EVERY PURPOSE



Small type Motor Coach trailing 20,000 lb. caboose up a four (4) mile 2.86 per cent grade on trial trip on the M. & P. R. R. out of Baltimore.

Gasoline-Driven Railway Equipment

PERFORMANCE, not theory, is what counts in the final analysis.

THE results secured by the combination of standard railway construction, with proven units of the automotive field, are amazing. When driving on all eight wheels our equipment has 100% of its weight on the driving wheels. This gives extraordinary traction. When using but four wheels as drivers our equipment can exert over twice the tractive effort, in proportion to weight of the average steam locomotive — plenty of surplus to pull one or more trailer coaches.

THE RUSSELL COMPANY

AUTOMOTIVE RAILWAY EQUIPMENT

KENOSHA, WISCONSIN

More tonnage
with the same equipment

How much your industrial trucks and tractors save you is after all a matter of tonnage. You move so many tons at such and such a cost.

But without increasing your cost, you may be able to increase your tonnage. With the Exide-Ironclad Battery, trucks move heavier loads and move them more rapidly. Note the four qualities of the Exide-Ironclad which are essential for freight-handling service:

1—**Reserve Power.** Exide-Ironclads deliver increasing power up to twenty times the normal rate of discharge, giving reserve power for steep grades and heavy loads.

2—**Sustained Power.** Voltage remains high throughout the entire discharge, which means power and high speed all day long.

3—**Ruggedness.** The Exide-Ironclad, built to stand severe service, is a brute for rough work.

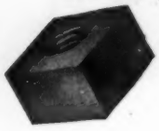
4—**Low cost per ton.** First cost plus upkeep, divided by tons hauled, gives a surprisingly low cost per ton.

Tear out this page, give it to your stenographer, and tell her to write today for a copy of our *free* booklet, "Facts for Consideration in *Selecting a Battery* for Industrial Truck and Tractor Service."

Exide
IRONCLAD
BATTERIES

THE ELECTRIC STORAGE BATTERY CO.
Philadelphia
Branches in Seventeen Cities
Manufactured in Canada by Exide Batteries of Canada, Limited
133-157 Dufferin St., Toronto

Where do Maintenance Costs Originate?



Except for the purchase price, few buyers know what they pay for a shipment of nuts.

Yet in locomotive maintenance, the purchase price of a nut may be only a fractional part of its cost. You keep on paying for it long after it has gone to the scrap heap.

Count the number of times in a year an engine is laid up for repairs—and note how frequently you can trace the trouble to a worn or defective nut.

It is then that you begin to get a real line on what these little pieces of metal are costing you.

You may save a small sum on the original price, only to pay it out many times over in premature breakdown, labor, time—a locomotive out of service.

That is hardly the sort of "economy" you reckon on when you decide in favor of hot pressed nuts. That such nuts represent a "saving" is a delusion that is costing a hundredfold their price in multiplied maintenance charges.

When you buy nuts you buy a certain amount of utility. And when hot pressed nuts, with their inevitable burrs, scale-filled threads, inaccurate fit and irregular shape, give nothing but a short and troubled career in return for your investment, they do more than rob you of the service you pay for—they run up a recurring overhaul and replacement charge by their unfailing tendency to work loose and wear out.

These things never happen with Empire Cold Punched Nuts. Once an Empire Nut is put in place it stays there for the life of the engine, or for the life of the part it is on.

Empire Nuts are made by the originators of the cold punching and cold heading processes for the manufacture of steel nuts and steel bolts. They are produced on a new type of automatic nut machine that cold punches, chamfers, trims, retrims and burnishes in one operation—steps that in any other plant require five separate machines. By this method a uniformity of precision is attained that is not possible with any other process—for tolerances are not disturbed by a multiplicity of set-ups and constant handling.

Empire Nuts are guaranteed free from flaws. They are guaranteed to fit. They are guaranteed never to strip their threads or fracture. They have no burrs. They have no scale. They are semi-finished to insure flush, smooth, clean contact. Their threads gauge to within .003 in.

Empire Nuts reduce maintenance charges to so low a level, as contrasted with the cost arising from the use of hot pressed nuts, that the net saving repays you a hundred times over for their slightly higher purchase price.

BOLTS EMPIRE NUTS-RIVETS

RUSSELL, BURDSALL & WARD BOLT & NUT COMPANY

PORT CHESTER, N.Y.

PEMBERWICK, CONN. • CHICAGO • SAN FRANCISCO • ROCK FALLS, ILL.

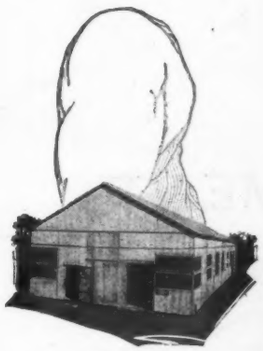
Makers of Bolts, Nuts and Rivets Since 1845

Santa Fe Buys Stefco

Ready-to-Erect Structural Steel Buildings

RAILROADS are fast turning to the use of STEFCO ready-built steel buildings because of their economy and adaptability as has already been demonstrated in other fields. The recent purchase of nine STEFCO buildings by the Santa Fe for use at various points on its system from Chicago to California is a recognition of the merits of this type of industrial building.

Designed along strict engineering lines, adaptable to every industrial use to which one story factory construction is suited, built in the largest units possible for convenient handling, easily and quickly expanded to meet future growth, STEFCO buildings are recognized by their hundreds of users throughout this country and abroad as a permanent, substantial, fire resisting and satisfactory substitute for all other forms of building construction.



—typical STEFCO installation of Ann Arbor R. R. Planing Mill. 40 x 112 x 16 ft. high.

Strength and Simplicity

STEFCO buildings are designed around their two outstanding features, strength and simplicity. The Fink type truss and sidewall frames are of structural steel angles, hot riveted throughout. The roof and sidewall covering are corrugated sheet steel galvanized to resist rust. STEFCO buildings throughout are composed of standardized units, which, in case of damage, can be replaced at once from the average railway storehouse stock without having to send away for some special design peculiar to a single manufacturer.

Ease of Erection

STEFCO buildings are thoroughly standardized and are 90% finished leaving the STEFCO factory. The other 10%, erection, is so simple that the ordinary section foreman and crew can do the work. Trusses up to 40 ft. single span are shipped complete and the other sections are built in the largest units possible for convenient handling. The only field work above the foundation is to bolt the wall sections together, on top of which the trusses are also bolted, apply the roof sheets and the building is ready for use.

40% Cost Saving

STEFCO buildings show a saving of 40% or more over similar buildings of brick or concrete, relieve the purchaser of all engineering costs and delays and eliminate entirely the fire hazards of wood construction.

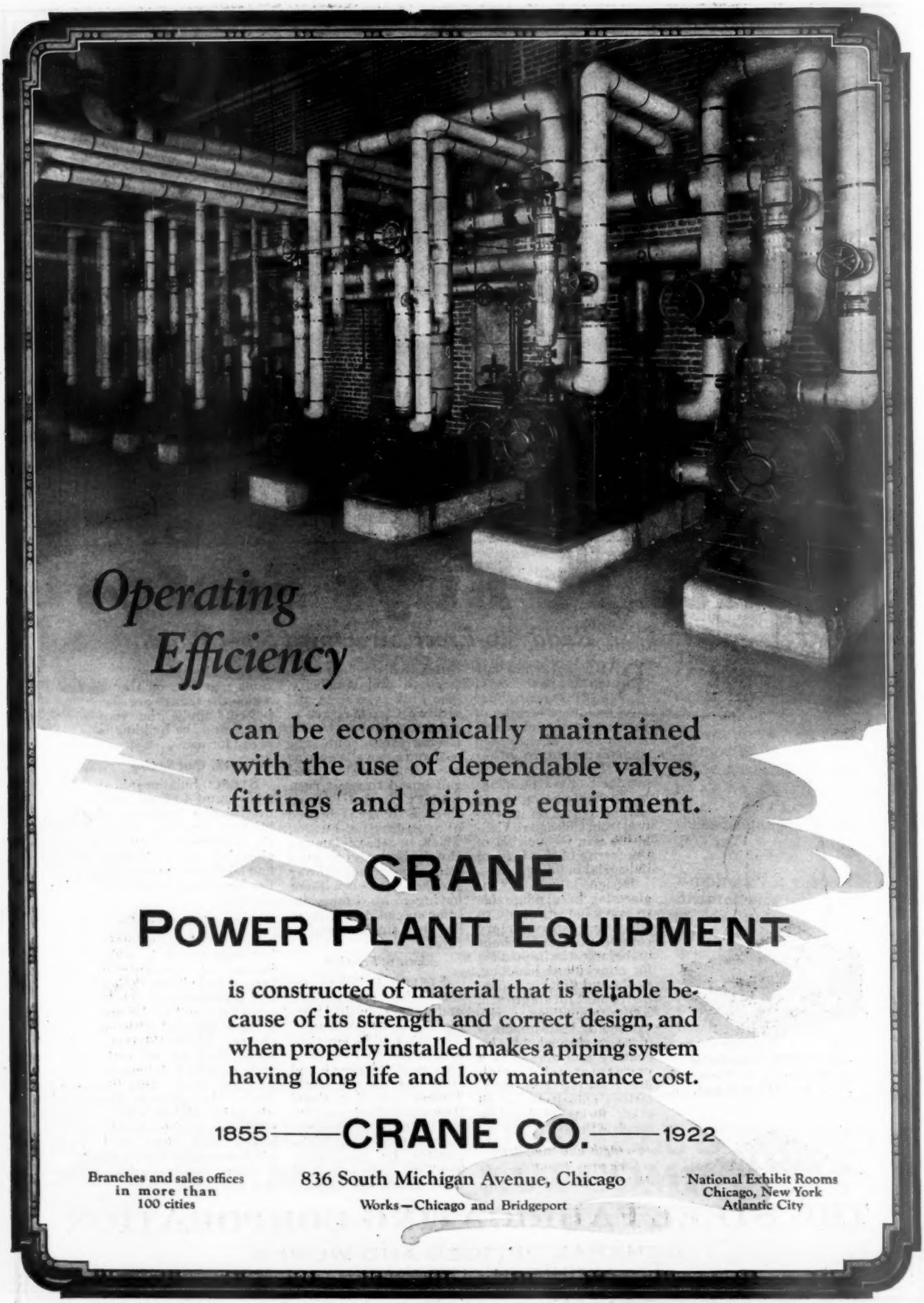
Free Advisory Service

The STEFCO engineering department is composed of recognized experts in building design and manufacture. Their experience and advice are at your disposal without charge. Utilize this service in securing an estimate on such buildings as you may need. Just indicate the purpose for which the building is to be used, the length, width, height and door and window arrangement and a comprehensive quotation will follow.

STEFCO

THE STEEL FABRICATING CORPORATION

GENERAL OFFICES AND WORKS
MICHIGAN CITY, INDIANA


Operating
Efficiency
can be economically maintained
with the use of dependable valves,
fittings and piping equipment.
CRANE
POWER PLANT EQUIPMENT
is constructed of material that is reliable be-
cause of its strength and correct design, and
when properly installed makes a piping system
having long life and low maintenance cost.
1855——CRANE CO.——1922
Branches and sales offices
in more than
100 cities
836 South Michigan Avenue, Chicago
Works—Chicago and Bridgeport
National Exhibit Rooms
Chicago, New York
Atlantic City

U-LOY STEELS

From the Electric Furnace

A heavy switch is thrown,—electricity of enormous power is released. An arc forms between the electrodes and the charge. Soon melting takes place.

So intense is this arc that it refines steel to a higher degree of purity than any other method. The injurious effects of sulphur and phosphorus are reduced to a minimum. Impurities are removed. Greatest freedom from surface and subsurface defects is insured. In purity, uniformity and homogeneity, U-LOY Electric Furnace Steels are far superior to even the best open hearth steels.

Perhaps U-LOY Electric Furnace Steels would improve *your* product,—no matter what it may be.

UNITED ALLOY STEEL CORPORATION
CANTON, OHIO

New York	Chicago	San Francisco
Syracuse	Detroit	Indianapolis
Cleveland	Buffalo	Portland

Open Hearth and Electric Furnace U-LOY Steels are furnished in:—

Blooms, Slabs, Billets, Plates, Bars, Rods. Bars Hot Rolled, Cold Drawn and Heat Treated to specifications

For—

Railroads
Automobiles
Edged Tools
Farm Implements

Toncan Metal

Anti-corrosive Roofing, Siding, Enameling Stock Electrical Sheets

One of our four Electric Furnaces pouring at night. A most fascinating and interesting sight.

Material Handling Cyclopedia

"Speeds Up" Freight Handling

Manual labor at your terminals, warehouses and transfer points can be greatly reduced and freight handling speeded up by letting machinery do the work. Before you decide you will want to know what devices are available for the purpose—how they operate and where they can be gotten. That's the reason for the Cyclopedia. It contains exactly the information you need.

Eighteen leading Consulting Engineers joined in planning the contents of the volume. Ten editors, headed by Roy V. Wright, Managing Editor, and John G. Little, Associate Editor of the Railway Age wrote the text to indicate clearly those methods and devices that would eliminate waste—multiply labor—power—save time and cut costs.

Pages of Vital Importance

The resulting pages show where up-to-the-minute equipment can supplant antiquated tools with tremendous gains in efficiency and lowered costs. Cranes, hoists, winches, derricks, excavators, buckets, steam shovels, scoops, magnets, car load and unloading machinery, tiering machines, industrial trucks, tractors and trailers—these are but a few of the devices described and illustrated—their functions fully explained and all arranged in easy-reference form.

Nation Wide Survey

Consider what a substantial saving per ton means to your road. Then look into the possibilities as shown in this nation-wide survey of mechanical handling equipment. Do this with the book before you at our expense.

You can have the Cyclopedia on your desk for 10 days' examination by having the coupon mailed to us—after proving its worth to you, either have your Purchasing Agent send us confirming order or let us have your check.

Definition Section—150 Pages

Terse, clear-cut definitions of the principal terms used in connection with material handling methods and equipment and unusually full and complete de-

scriptions of the mechanisms of the various devices are given.

Technical Section—550 Pages

Principal types of material handling machines are taken up under classified headings. Transferation principles are discussed at length showing the advantages of the various types of machines for specific lines of work. Carefully chosen photographs, together with line drawings, charts, curves, etc., render the text easily understood.

Catalog Section—150 Pages

Enlarges and completes the other two sections. Leading manufacturers illustrate and describe their own products, pointing out the particular advantages of their devices for certain branches of industrial service. These pages are grouped according to the nature of service the devices perform. All three sections are cross referenced so that you can find any information you need in a moment.

Important Features

A *Directory of Products*, a *Trade Name Index* and an *Alphabetical Index of Manufacturers* are included for ready reference.

Simmons-Boardman Publishing Co.
BOOK SERVICE DEPT.
Woolworth Building, New York, N. Y.
34 Victoria St., Westminster S. W. 1, London, England
"The House of Transportation"

CROSS OFF BINDING YOU DO NOT DESIRE

SIMMONS-BOARDMAN PUBLISHING CO.,
Book Service Department,
Woolworth Building, New York, N. Y.

Please send prepaid a copy in { Buckram $10.00 / Leather 15.00 } of Material Handling Cyclopedia for 10 days free examination. If I wish to retain it I will see that you receive confirming order or check in payment.

Name .....

Address .....

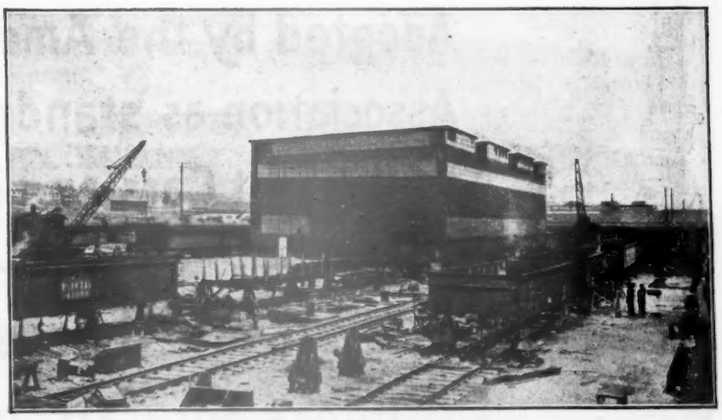
City ..... State.....

Position ..... R. R. .....
(A 8-7)

PENNSYLVANIA
TANK CARS

PENNSYLVANIA TANK CARS

KANSAS CITY PLANT



SHARON PLANT

Added Facilities for Car Repair Work

We show above (upper) two views of our recently completed car plant at Argentine, Kansas; and (below) two views showing freight cars being repaired in the yards of our big modern shop recently added to our Sharon, Pa., facilities for the construction and repair of freight and tank cars.

These two big new shops afford our customers an Eastern and a Western plant where tank cars in the Eastern, Mid-Continent, and Western fields may be repaired quickly and sent back to production field operations in the shortest possible time.

"PENNSYLVANIA" Construction principles and the same quality workmanship found in "PENNSYLVANIA" Tank Cars are also available at both of these plants for the construction and repair of freight cars.

May we submit a quotation on your car repair needs? Write us for details.

THE PENNSYLVANIA TANK CAR COMPANY
PENNSYLVANIA CAR COMPANY
PENNSYLVANIA TANK LINE
Sharon, Pennsylvania

New York St. Louis Kansas City Tulsa Houston Denver Tampico San Francisco

"Pennsylvania" Tank Cars are used by Leaders of Industry

SHARON COUPLERS

Top, Bottom and Side Operating Types
for
Freight and Passenger Cars and Locomotives

A·R·A·STANDARD "D" COUPLERS

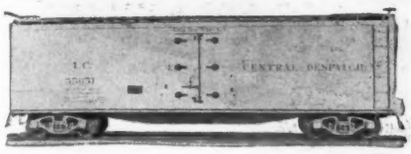
Adopted by the American Railway
Association as standard equipment
for Freight Cars and Locomotives

One-half and Three-quarter size
Couplers for narrow gauge cars.

THE NATIONAL MALLEABLE CASTINGS COMPANY

CLEVELAND SHARON, PA. | CHICAGO MELROSE PARK, ILL. | INDIANAPOLIS EAST ST. LOUIS, ILL. | TOLEDO

~ GENERAL AMERICAN ~



The Yard Report Tells the Real Story

Note, in any large freight terminal, the large representation of General-American-made cars of all types—box, refrigerator, automobile, furniture, stock, flat, grain and gondola—bearing the names and trade-marks of America's biggest railroads and manufacturers.

A letter brings our representative ready to go into your car building problem.

GENERAL AMERICAN CAR COMPANY

Subsidiary of The General American Tank Car Corporation

General Offices:
Harris Trust Bldg., Chicago

Cable Address: "Gentankar, Chicago" All Codes
References: Any International Banker

Foreign Representatives:

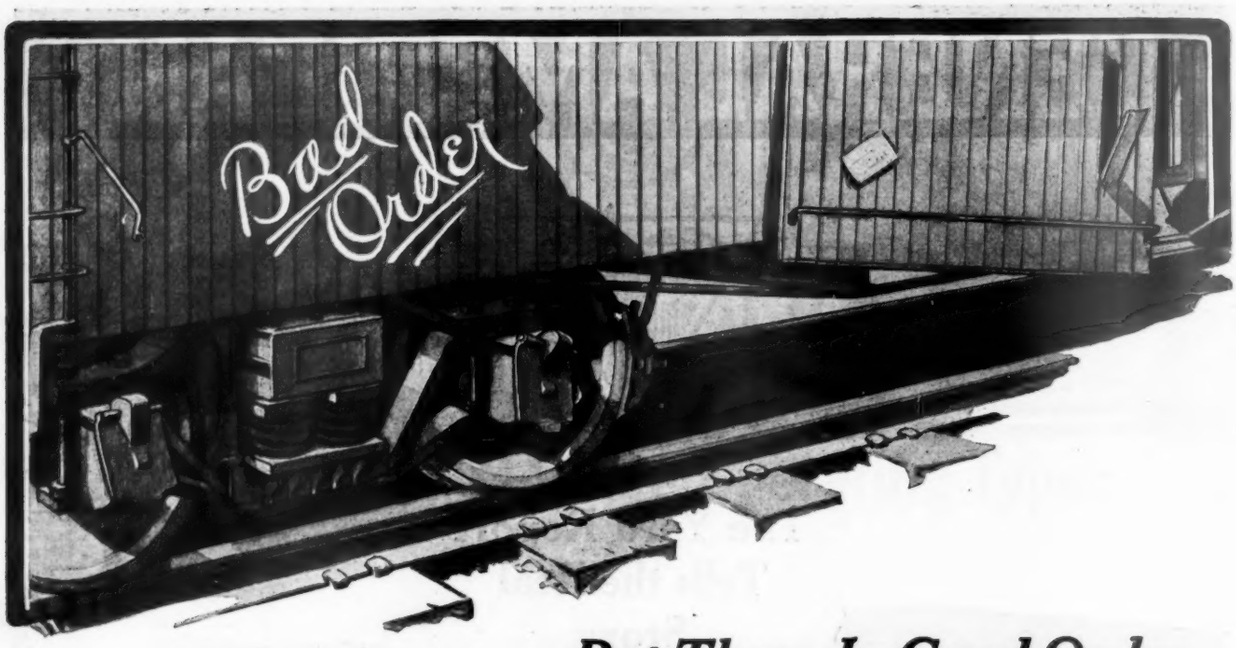
M. Samuel & Co., Ltd., 25 Bishopsgate, London, England
Frazer & Chalmers, Ltd., Johannesburg, South Africa
E. Thornton & Company, Antwerp, Belgium
Hackley-Sidwell, S. A., Mexico City, Mexico

Far Eastern Offices:
38 C Canton Road, Shanghai, China
36 Ma Shih Ta Chieh, Pekin, China

Orders accepted for

Pressed Steel Shapes
Gray Iron Castings

RAILWAY CARS ~ EVERY TYPE



Put Them In Good Order with Certified Malleables

The same superior qualities that commend Certified Malleables for new construction of locomotives, freight cars, passenger cars and track parts make them indispensable for the extensive railway repair work now in progress.

Repair parts of Certified Malleable meet the most severe and exacting requirements of railroading. They have great tensile strength, high elastic limit and toughness to resist shocks, strains and the wear and tear always present in railway service.

They have greater rust resistance than other ferrous metals and are better adapted to the constant exposure of railway equipment than parts of pressed or cast steel.

Certified Malleables possess great strength and endurance that insure years of safe, continuous service and obviate the expense of frequently tearing cars apart to replace vital parts destroyed by breakage or corrosion.

Plants Awarded Certificates for the Quarter Ending March 31, 1922

Albany Malleable Iron Co.	Albany, N. Y.
Albion Malleable Iron Co.	Albion, Mich.
American Malleable Castings Co.	Marion, O.
American Malleables Co.	Lancaster, N. Y., and Owosso, Mich.
Badger Malleable & Mfg. Co	South Milwaukee, Wis.
Baltimore Malleable Iron & Steel Casting Co	Baltimore, Md.
Belle City Malleable Iron Co	Racine, Wis.
Chain Belt Co	Milwaukee, Wis.
Chicago Malleable Castings Co	West Pullman, Chicago, Ill.
Columbus Malleable Iron Co., The	Columbus, O.
Danville Malleable Iron Co	Danville, Ill.
Dayton Malleable Iron Co	Dayton, O. and Ironton, O.
Decatur Malleable Iron Co.	Decatur, Ill.
Devlin Mfg. Co., Thomas	Philadelphia, Pa.
Eastern Malleable Iron Co., The—Works, Naugatuck, Conn.; Bridgeport Malleable Iron Works Bridgeport, Conn.; Troy Malleable Iron Works, Troy, N. Y.; Wilmington Malleable Iron Works. Wilmington, Del.; Vulcan Iron Works, New Britain, Conn.	Naugatuck Malleable Iron
Erie Malleable Iron Co.	Erie, Pa.
Federal Malleable Co.	West Allis, Wis.
Fort Pitt Malleable Iron Co.	Pittsburgh, Pa.
Frazer & Jones Co.	Syracuse, N. Y.
Illinois Malleable Iron Co.	Chicago, Ill.
Iowa Malleable Iron Co	Fairfield, Ia.
Kalamazoo Malleable Iron Co.	Kalamazoo, Mich.
Laconia Car Co	Laconia, N. H.
Lakeside Malleable Castings Co.	Racine, Wis.
Lancaster Foundry Co.	Lancaster, Pa.
Link-Belt Co.	Indianapolis, Ind.
Marion Malleable Iron Works	Marion, Ind.
Moline Malleable Iron Co.	St. Charles, Ill.
National Malleable Castings Co., The Cleveland, O., Chicago, Ill., Indianapolis, Ind., Toledo, O., E. St. Louis, Ill.	
Northern Malleable Iron Co.	St. Paul, Minn.
Northwestern Malleable Iron Co	Milwaukee, Wis.
Peoria Malleable Castings Co	Peoria, Ill.
Pittsburgh Malleable Iron Co.	Pittsburgh, Pa.
Rhode Island Malleable Iron Works	Hillsgrove, R. I.
Rockford Malleable Iron Works	Rockford, Ill.
Ross-Meehan Foundries, The	Chattanooga, Tenn.
St. Louis Malleable Casting Co.	St. Louis, Mo.
Saginaw Malleable Iron Co.	Saginaw, Mich.
Standard Malleable Castings Co.	Terre Haute, Ind.
Stowell Co., The	South Milwaukee, Wis.
Symington Co. T. H., The	Rochester, N. Y.
Temple Malleable Iron & Steel Co.	Temple, Pa.
Terre Haute Malleable & Mfg. Co.	Terre Haute, Ind.
Trenton Malleable Iron Co., The	Trenton, N. J.
Union Malleable Iron Co., The	E. Moline, Ill.
Vermilion Malleable Iron Co.	Hoopeston, Ill.
Wanner Malleable Iron Co.	Hammond, Ind.
Warren Tool & Forge Co.	Warren, Ohio
Webster Mfg. Co., The	Chicago, Ill.
Wisconsin Malleable Iron Co.	Milwaukee, Wis.
York Mfg. Co.	York, Pa.
Zanesville Malleable Co.	Zanesville, O.

Certificate holders listed here are manufacturers whose product for the quarter indicated has regularly met the requirements of the Association. In the judgment of the Association's Consulting Engineer, their plant practice is such as to produce uniform material of high character and integrity.

THE AMERICAN MALLEABLE CASTINGS ASSN.
The 1900 Euclid Building Cleveland, Ohio

POSITIVE · PHYSICAL · PROPERTIES
AcA CERTIFIED TRADE MARK

CERTIFIED-MALLEABLE CASTINGS

ILLINOIS

FORGED

ROLLED

GARY
STEEL WHEELS

Represent

SAFETY MILEAGE ECONOMY EFFICIENCY

Every operation on these wheels, from the smelting of the ore to the rolling or forging of the billets into their final shape is carefully inspected and the work is carried to successful completion under the guidance of these inspections and of such laboratory tests as may be necessary to check results.

Illinois Steel Company

General Offices, 208 S. La Salle Street
CHICAGO, ILLINOIS

"Railway" Products

SPRINGS

— of all types, shapes and capacity for locomotive, passenger coach and freight car equipment.

TIRES

—Locomotive driving wheel, engine truck and tender wheel, also car wheel tires.

WHEELS

—all classes of steel tired wheels in general use under locomotive and car equipment.

"RAILWAY" SERVICE

"Railway" extends a service which accepts definite responsibility. Whatever your requirements, presenting special problems, whether on old or new equipment, our engineers will furnish dependable counsel, plans and estimates.

RAILWAY STEEL-SPRING COMPANY

GENERAL-OFFICES
30 Church St., New York

BRANCHES
Chicago Denver Detroit
Louisville Mexico City
St Louis St Paul Norfolk
New Orleans

PROPER COVERING

Unity of the superstructure becomes an accomplished fact when the MURPHY SOLIDSTEEL ROOF is placed on a steel-frame or all-steel box car. It forms in itself a gusset plate over the entire body.

STANDARD RAILWAY EQUIPMENT CO.

MURPHY SOLIDSTEEL ROOFS

NEW YORK
CHICAGO
WASHINGTON DENVER
RICHMOND
PHILADELPHIA
ST. LOUIS
HOUSTON
KANSAS CITY
SAN FRANCISCO
MONTREAL

WORKS—NEW KENSINGTON PA.

The Box Is Part of the Frame

Truck Side Frames with Integral Journal Box

reducing truck parts to a minimum—are not a novelty. There are many thousands of them in service. They have demonstrated that they have ample strength for hard service.

The material is open hearth steel made by a company whose specialty for over 20 years has been the production of such steel.

Perfect annealing is insured by furnaces of which the temperature is controlled by thermo-electric pyrometers. The operation is too delicate and the result too important to trust to the accuracy of the human eye.

Prints or information on request.

SCULLIN STEEL CO.

STEEL PRODUCTS

ST. LOUIS
Main Office & Works

NEW YORK
2050 Grand Central Terminal

CHICAGO
1022 McCormick Bldg.

ST. PAUL
Merchants Bank Bldg.

In its Rolling Mill Department the Scullin Steel Co. rolls standard sizes Merchant Bars—Squares and rounds also flats 7½ in. and under; Structural Shapes—channels and beams 8 in. and under, angles up to 6 in., light rails up to 50 lb., and special sections on request.

"Not only to make better products but to make them better understood—not only to sell but to serve, assisting those who buy to choose as well as use their purchases —this is the privilege if not the practice of all modern manufacturers."— *Vauclain.*

Bulletin No. 3

HOW DO YOU JUDGE?

No two manufacturers can make Forgings in exactly the same way....

This difference allows a latitude of choice....It means that purchasers must differ in their judgment as to what is actually the best....

In recognition of this fact, the Standard Steel Works Forgings are sold on a new basis....They are offered only where it is agreed that "Comparison Measurements" are such as to measure the true difference in values....

May we send you details?

- Steel Tires
- Steel Tired Wheels
- Solid Forged and Wrought Steel Wheels
- Rolled Steel Gear Blanks
- Steel Axles
- Steel Springs
- Steel Forgings
- Steel and Malleable Iron Castings
- Rolled Steel Rings
- Steel Crusher-Rolls and Shells
- Steel Pipe Flanges

STANDARD STEEL WORKS COMPANY

PHILADELPHIA, PA.

BRANCH OFFICES

CHICAGO, ST. LOUIS, HAVANA, CUBA
HOUSTON, TEXAS, PORTLAND, ORE., RICHMOND, VA.
SAN FRANCISCO, NEW YORK, BOSTON
ST. PAUL, MINN., PITTSBURGH, PA., MEXICO CITY, MEX.
LONDON, ENGLAND, PARIS, FRANCE

WORKS: BURNHAM, PA.

Close-Fitting Shirts

"Close is my shirt, but closer is my skin."

An old proverb, but it fits the case of a box car roof as if it were made for it.

The shirt, in its primary use, is for weather protection.

The closer it adheres to the body, the more work the movements of the body make for shirtmakers and the sooner it loses its protective integrity.

The car roof weatherproof covering rigidly attached to the body of the car soon loses its protective value because of car movements. This makes work for car repairers.

HUTCHINS ALL-STEEL FLEXIBLE ROOFS

(*Dry Lading Roofs*)

are like a comfortably fitting shirt; yielding to the movements of the body and not liable to be torn by them.

HUTCHINS CAR ROOFING COMPANY
DETROIT MICHIGAN

Another Way To Save—And Earn

ON a number of roads, passenger engines are running from 400 to over 700 continuous miles.

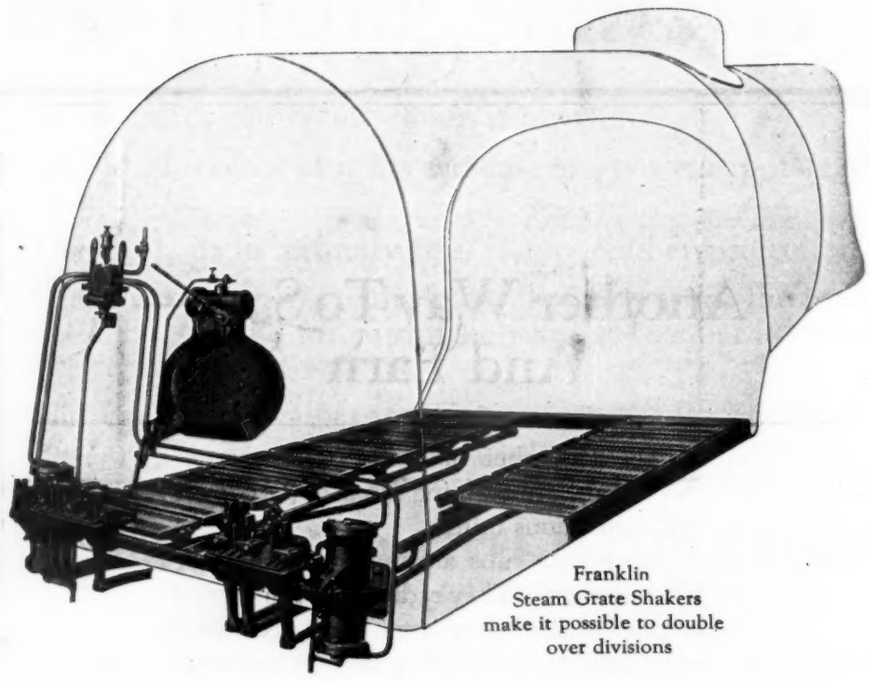
These long runs are making money for the railroads. They reduce the number of engines in use; they eliminate a great deal of maintenance, and they save an immense amount of stand-by loss in coal.

The better your locomotives, the more you can save by lengthening your runs. The Vitalizing Factors, on new or old locomotives, collectively add 30 to 80 per cent more power per pound of fuel, according to speed.

Vitalize a locomotive and it will pull more tons a greater distance than it ever did before.

G. M. Basford Company

We will gladly answer any questions concerning vitalizing factors and their uses. Write us at 17 East 42nd Street, New York City.



Franklin
Steam Grate Shakers
make it possible to double
over divisions

Full Steam Pressure All the Way

LONGER locomotive runs are logical to secure greater service from the locomotive investment.

But keeping locomotives longer on the road involves keeping their fires clean. Here is where the Franklin Steam Grate Shaker fits in.

When a fire becomes over 8 inches deep, little air gets through the grates to assist combustion.

A man firing heavily has no time to stir the fire by hand; so coal impurities collect on the grates to form clinkers and the fire grows steadily worse.

But with grate shaking made easy by the Franklin Steam Grate Shaker, just a touch of a lever shakes the grates by power and keeps the fire free and clean.

Limiting locks prevent any possibility of the grates dumping when the fireman only wants to stir the fire.

When you try longer locomotive runs, as you will, use a Steam Grate Shaker engine.

This will help keep full steam pressure all the way.

Franklin Railway Supply Company, Inc.

17 East 42nd Street, New York

332 So. Michigan Avenue, Chicago, Ill. — 1209-12 Praetorian Bldg., Dallas, Texas. — 774 Monadnock Bldg., San Francisco, Cal.

Franklin Railway Supply Company of Canada, Limited, Montreal
Export Department—International Railway Supply Co.—30 Church St., New York

ROME SUPERIOR STAYBOLT IRON

The Big Moment

There are many big moments in the life of a staybolt.

Every time the fire-door is opened the fire-box breathes — and staybolts must bend.

When the throttle is moved, when the fire is cleaned — staybolts must bend with the movement of the fire-box sheets.

Only a well-made, puddled pig iron will stand up in staybolt service.

Such an iron is Rome Superior.

Rome Iron Mills,
INCORPORATED
17 East 42nd St., New York
Works at Rome, N.Y.

CHICAGO ST. LOUIS HOUSTON, TEX. SAN FRANCISCO
SEATTLE, WASH. BOSTON RICHMOND, VA. MONTREAL
Export Agents-International Railway Supply Company-30 Church Street, New York

These boilers, removed because of a recently enacted state law prohibiting the use of boilers after 30 years' service, were fitted with boiler tubes made of Parkesburg Charcoal Iron. After 40 years of service, these tubes of Parkesburg Charcoal Iron are in almost perfect condition.

The Longer They Last, The Less They Cost

THE discriminating motorist buys a 12,000 or 10,000 mile tire in preference to the one guaranteed for 5,000 miles. He willingly pays the higher price because he knows the tire of longest mileage is really the cheapest.

Unfortunately, operating, mechanical and geographical conditions make it impracticable to guarantee the service life of any boiler tube.

But this much we know: On road after road, Parkesburg Charcoal Iron Boiler Tubes are giving much longer service than that previously received from tubes of other material.

Retube a few of your locomotives with Parkesburg Charcoal Iron Boiler Tubes. Select your most troublesome district for the test. Compare the service and figure the comparative cost.

A little folder with an interesting story of the Charcoal Iron Boiler Tube. Send for a copy.

THE PARKESBURG IRON COMPANY

PARKESBURG, PA.

BRANCH OFFICES

New York, 30 Church Street—Boston, Oliver Building—Chicago, Fisher Building
Philadelphia, Commercial Trust Building—St. Louis, Security Building
San Francisco, Rialto Building—St. Paul, Merchants National Bank Building
Montreal, New Birks Building

EXPORT AGENTS

Wenham, Bates & Goode Trading Corporation, New York

"V" Pilot Packing

In Spiral Form

"V" Pilot Packing in spiral form comes in 10 ft. lengths from one quarter inch in diameter up, including all one sixteenth sizes.

In ordering specify whether for steam, air or water service.

"V" Pilot Packing combines the wear resisting features of solid metal packing with the easy adaptability of the soft, fibrous packing.

It presents a continuous metal bearing surface to the rod; backed by a resilient fabric of asbestos.

Service results on "V" Pilot Packing have proven an increase in packing life of several hundred per cent.

RAILROAD STATIONARY POWER PLANTS
Steam Rods (Either Rotary or Reciprocating)
Valve Stems
Boiler Feed Pumps Steam & Water Ends
Steam Hammers
Air Compressors

PUMPING STATIONS
Outside Packed Plungers,
Piston Rods, Steam or Water,
Excellent for all classes of Petroleum oils, hot or cold.

MARINE FLOATING EQUIPMENT
Main Engines
Pumps
Winches
Dynamo Engines
Steering Engines
Expansion Joints

PILOT PACKING CO., Inc.

Jos. Sinkler, General M'g'r.

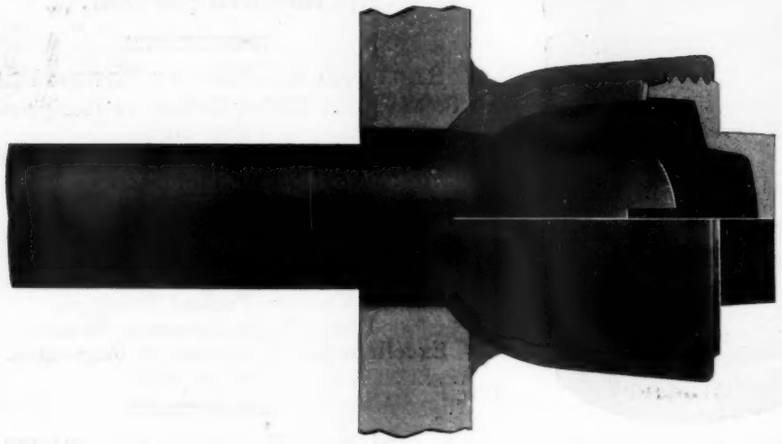
Peoples Gas Building
CHICAGO

One Water Street
NEW YORK

PILOT

Monadnock Building
SAN FRANCISCO

FLANNERY F. B. C. WELDED FLEXIBLE STAYBOLTS



Flannery F. B. C. Welded Flexible Staybolts

The shorter sleeve projection in the sheet and around the bolt body under the head of F. B. C. Flexible Staybolts not only permits greater range of flexibility, but is particularly advantageous in renewing fireboxes or sheets.

Slight errors in hole alignment, after sleeve is secured, are also readily accommodated because of this feature.

If you are not familiar with all the features of F. B. C. Welded Flexible Staybolts—let us send complete information today as to how you can advantageously standardize on the F. B. C. Staybolt.

FLANNERY BOLT CO.
PITTSBURGH, PA.

FAITH JUSTIFIED

On May 30th a special silk train on the Lackawanna, consisting of one coach and six refrigerators, left Black Rock, N. Y., at 1:30 a. m., arriving at Hoboken, N. J., at 9:18 a. m.—a distance of 401 miles in 468 minutes. This time includes five stops for water and change of engines. The train was hauled by three Alco designed and built locomotives, one of which is shown above.

The importance of this shipment dictated the necessity for locomotives of unusual stamina—faith in Alco influenced their selection, which the gratifying results abundantly justified.

This performance must impress those who seek the utmost in design and construction, with the desirability of Alco qualities, and you may profitably consider whether or not you can afford to invest in locomotives that do not embody them.

AMERICAN LOCOMOTIVE COMPANY

30 CHURCH STREET NEW YORK CITY

ALL-METAL
Steam Heat Connections

The Same Money

that you have charged to maintenance year after year, for perishable hose would now represent invested dividend paying capital if some of it had been used to purchase BARCO ALL-METAL STEAM HEAT CONNECTIONS. Nearly half of your hose must be renewed this year—why not start *now* to equip your rolling stock with steam heat connections that will outlive the hose many times?

Conclusive Railroad Test

records are available showing that by increasing regulator valve pressure 50% "without making any other changes" the pressure may be increased 70% at the fifth car and 400% at the tenth car in less than one-sixth of the time.

No. of Test	Pressure Regulating Valve	Pressure at 5th Car	Pressure at 10th Car	Duration of Test	Outside Temperature
3-A	58 lbs.	20 lbs.	1 lb.	45 min.	40°
3-B	89 lbs.	34 lbs.	5 lbs.	6 min. 21 sec.	41°

BARCO Connections Stand The Extra Pressure

Barco Manufacturing Company

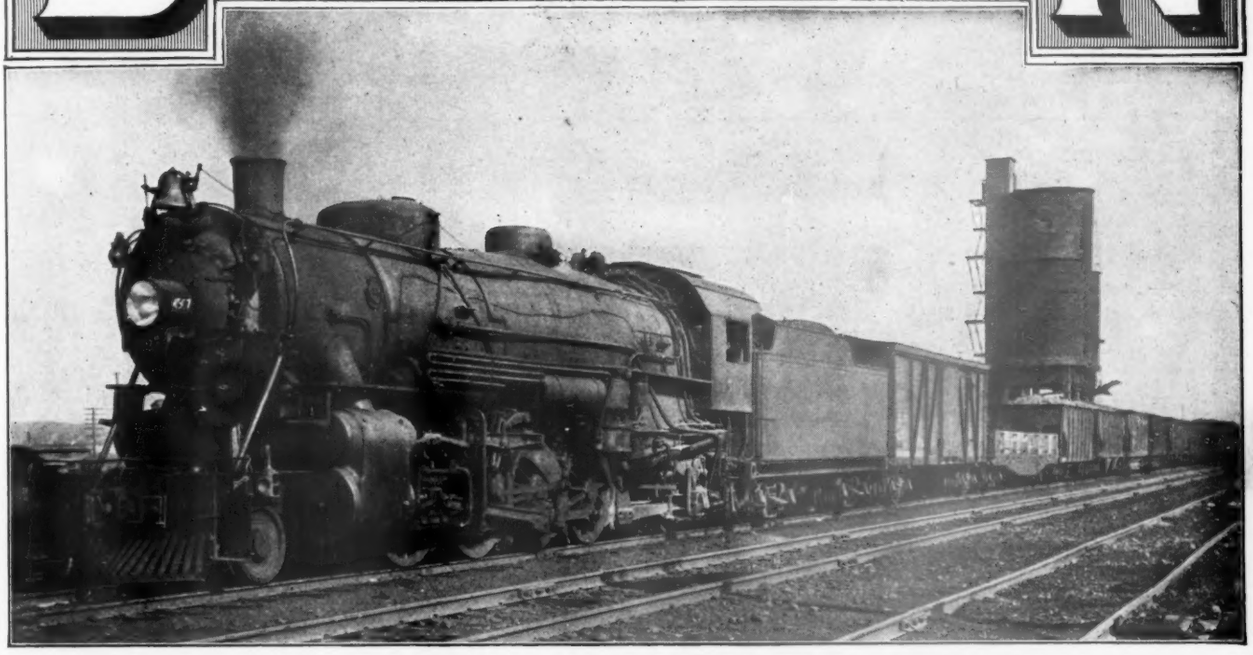
IN CANADA
MONTREAL - TORONTO

CHICAGO, ILL.

IN CANADA
WINNIPEG - VANCOUVER

THE HOLDEN CO., LTD.,

BALDWIN



A BALDWIN MIKADO WHICH DEVELOPS A TRACTIVE FORCE OF 54,700 POUNDS
Cylinders, 26x30". Driving wheels, diameter, 63". Total weight, 290,800 pounds. Weight on drivers, 221,500 pounds

More Than 500 Baldwin Mikados Built for The Baltimore & Ohio

THE Baltimore and Ohio was among the first of the great railroad systems in the United States to introduce the Mikado type on a large scale.

The first Baltimore & Ohio Mikados were built by these Works in 1911, and due to their success, orders for additional locomotives of this type soon followed. The total number of Baldwin Mikados thus far built for this railroad is 520.

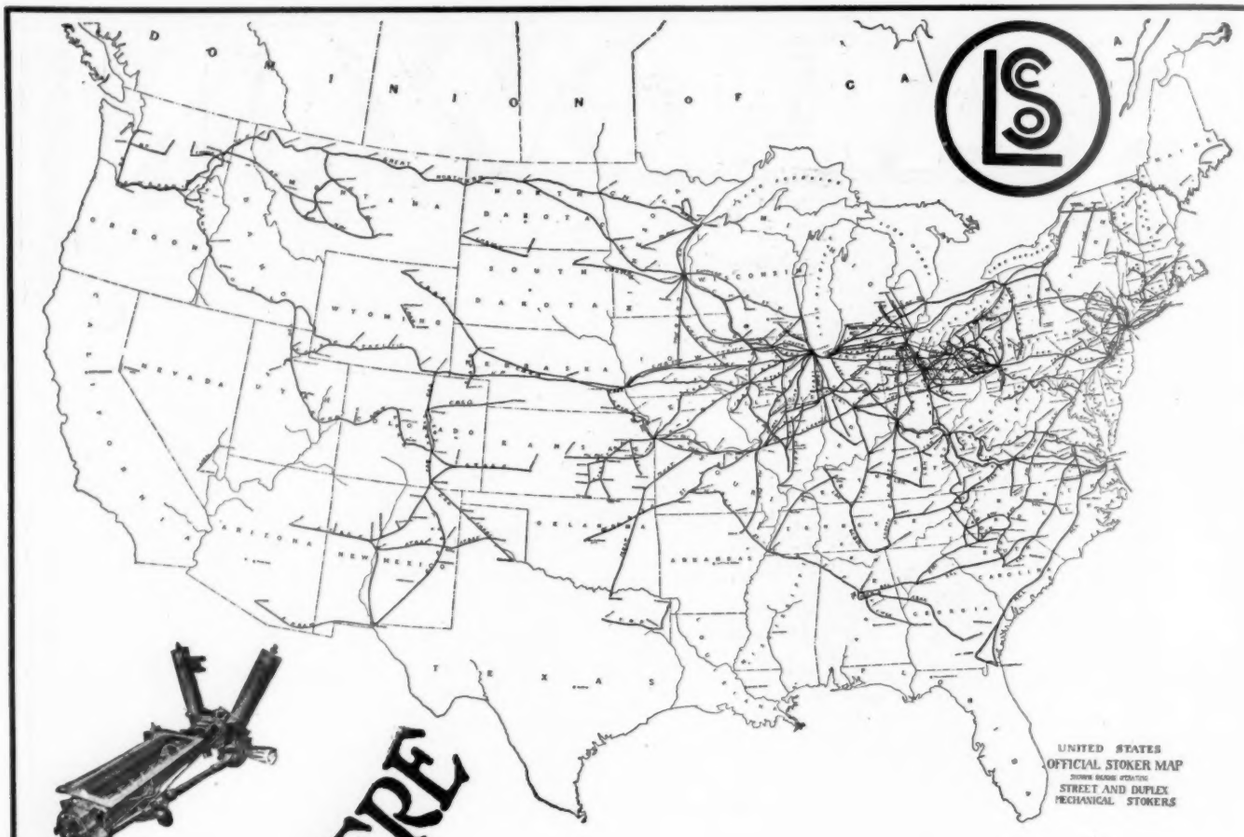
These locomotives have been generally distributed over the system and are now working the greater part of the through freight traffic, excepting on certain mountain divisions where Mallet and Ten-Coupled locomotives are used.

The illustration shows Engine 4507, a Class Q-3 Mikado, hauling 4343 adjusted tons, in 57 loaded cars, on the run from Wilsmere, near Wilmington, Del., to Jersey City. The full rating for Class Q-3 on this division is 4400 adjusted tons.

THE BALDWIN LOCOMOTIVE WORKS
PHILADELPHIA

808

LOCOMOTIVES



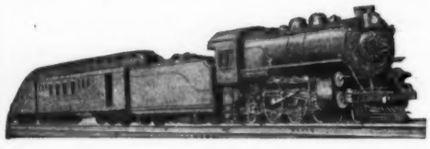
EVERY WHERE

Duplex Stokers

DUPLEX STOKERS are in successful operation throughout the World.

From the Atlantic to the Pacific—in the United States—you find Duplex Stokers. You find them likewise in Canada, and in far-off Java, Korea and Manchuria.

Duplex Stokers are not confined to any Coal, Country or Clime.

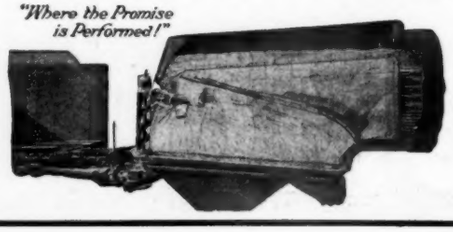


4,800 of Our Stokers in Service on 76 Railroads

LOCOMOTIVE STOKER COMPANY

Main Office and Works, Pittsburgh, Pa.

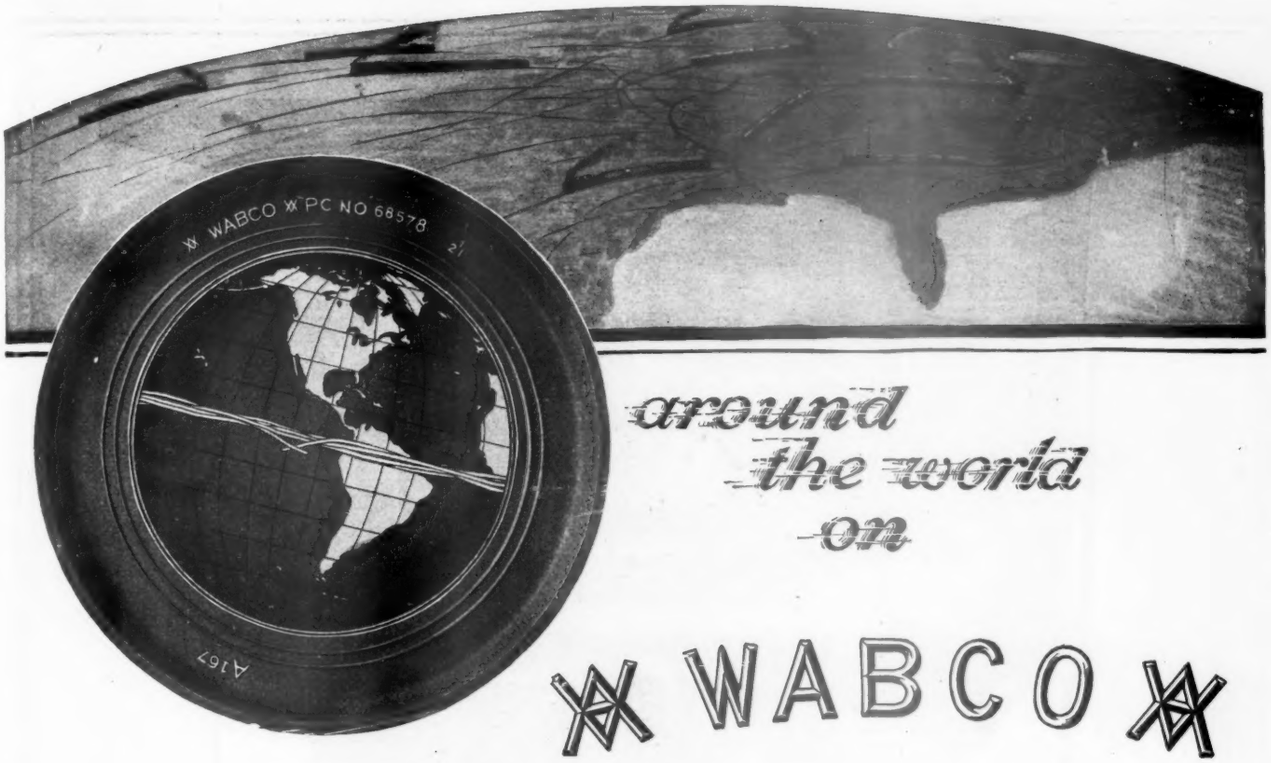
"Where the Promise is Performed!"



50 CHURCH STREET
NEW YORK

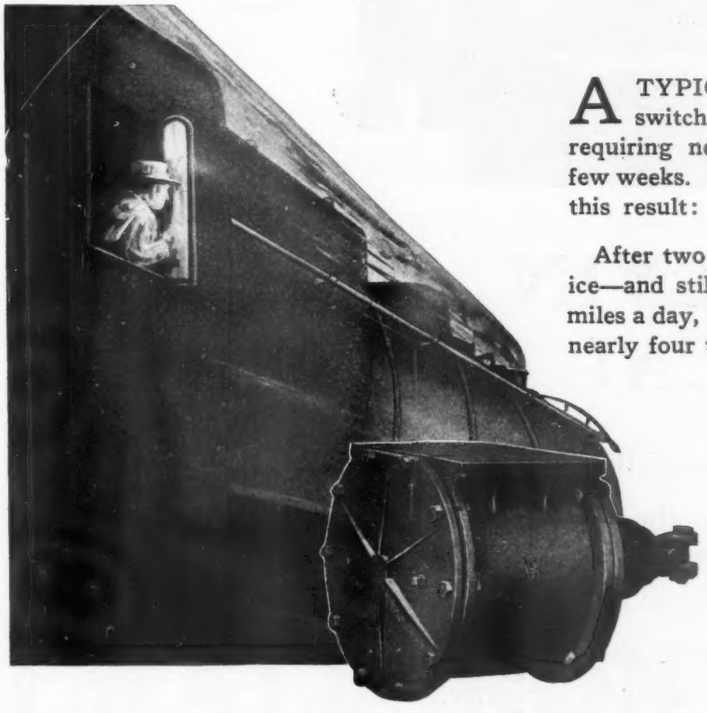
RAILWAY EXCHANGE
CHICAGO, ILL.

MUNSEY BUILDING
WASHINGTON, D. C.



around the world on

WABCO



A TYPICAL WABCO performance. A number of switching locomotives on hard 24-hour shifts were requiring new Driver Brake Cylinder Packings every few weeks. Then WABCO Cups were given a trial, with this result:

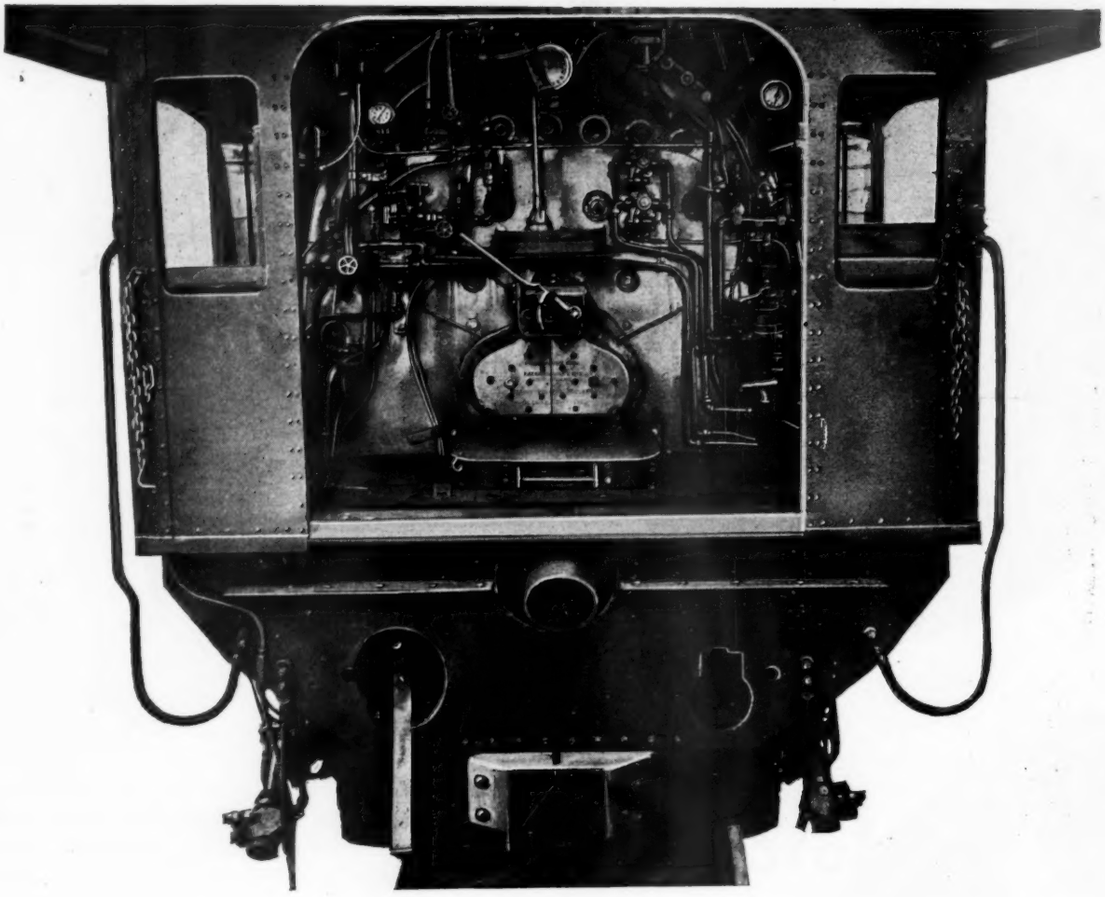
After two years the WABCO Cups were still in service—and still air-tight. These locomotives average 160 miles a day, 10 months a year, 96,000 miles in two years—nearly four times around the World!

The marvelous durability of WABCO Brake Cylinder Packing Cups has been established beyond dispute. They are not affected by any brake cylinder temperature encountered under actual operating conditions, will not deteriorate in oil or water, and permit of free cylinder lubrication with any standard grease.

WESTINGHOUSE AIR BRAKE CO.

General Office and Works, Wilmerding, Pa.

New York Washington Pittsburgh Chicago St. Louis San Francisco



ELVIN MECHANICAL STOKERS

Are easily and economically installed.

They run quietly, do their work efficiently, and are easily operated without frequent adjustments regardless of sizes of coal being fired.

If you will investigate their performance, you will be convinced of their superiority.

May We Show You?

ELVIN MECHANICAL STOKER COMPANY
50 Church St. **New York**

All Staybolt Iron Looks Good— In The Store Room

¶ Not first cost, but final cost determines the real worth of any staybolt iron. And the only true test of this is the results which are given in actual service.

¶ This is the basis upon which the reputation of Tennessee Charcoal Bloom Staybolt Iron has been persistently maintained for over three quarters of a century.

EWALD IRON COMPANY
INCORPORATED
LOUISVILLE

CHICAGO NEW YORK ST. PAUL

"In Use Since Eighteen Forty-Four"

How Many "*Frame Failures*" Have You Had in Six Years ?

ON one large road, on which Vanadium Steel Frames have long been standard, there were only three frame failures in six years. Two of these were caused by the failure of other parts of the locomotives.

Vanadium steel is stronger and tougher than plain carbon steel. It has a much higher elastic limit or useful strength. Its Vanadium content gives it a greater resistance to shocks and dynamic stresses.

Vanadium Steel Frames are stronger than plain Carbon-Steel Frames

We have some interesting data on the service life of Vanadium Steel Frames on many of the largest roads. May we submit them to you?

VANADIUM CORPORATION OF AMERICA

CHICAGO
208 So. LaSalle St.

120 Broadway
New York

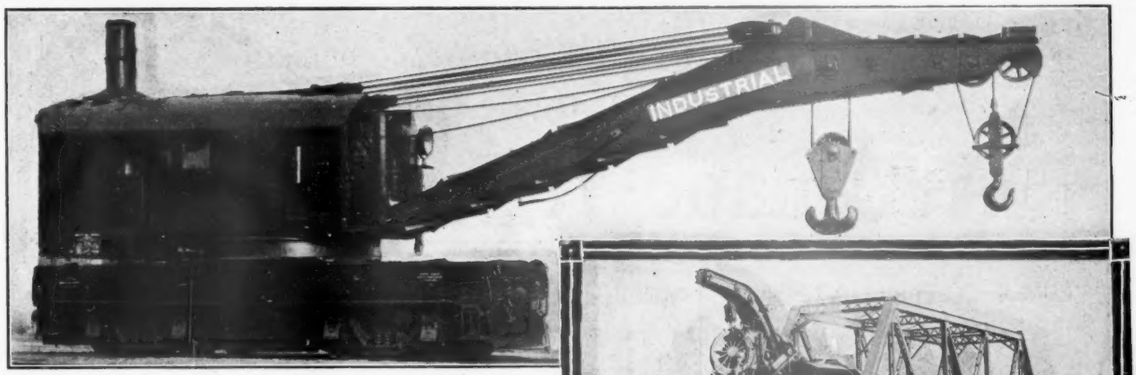
DETROIT
849 Book Bldg.

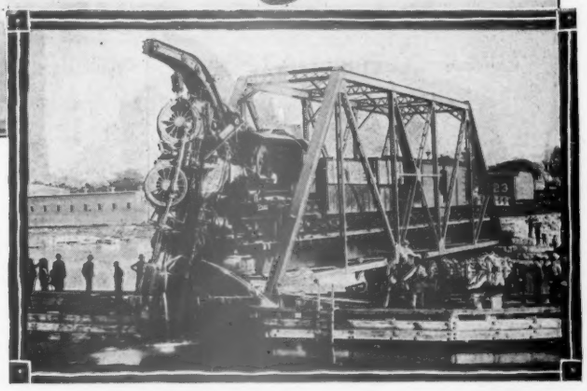
A·R·A· type D· Couplers

The production of over four million successful Couplers gives assurance of highly perfected manufacturing processes and guarantees conformity to standards throughout.

American Steel Foundries

NEW YORK CHICAGO ST. LOUIS





Steam or electrically operated Wrecking Cranes in capacities of seventy-five tons to two-hundred tons.

Cranes and Pile Drivers furnished to suit any gauge, clearance, and axle load requirements.

Your needs, when referred to Industrial Works engineers, will receive the benefit of 49 years' experience in the designing and building of material-handlng equipment.

General Catalog No. 110 will be forwarded upon application.

INDUSTRIAL WORKS

BAY CITY, MICHIGAN.

NEW YORK 50 Church Street | PHILADELPHIA Widener Bldg. | DETROIT Book Bldg. | CHICAGO McCormick Bldg.

F. H. Hopkins & Co., Montreal and Toronto, Canada

Locomotive, Erection and Wrecking Cranes, 5 to 200 tons capacity. Pile Drivers, Pillar Cranes, Transfer Cranes, Gantry Cranes, Crawling Tractor Cranes, Rail Saws, Grab Buckets, Double-Acting Steam Pile Hammers, Wood Grapples.

Prompt deliveries can be made on any type of Crane

EDGEWATER STEEL COMPANY

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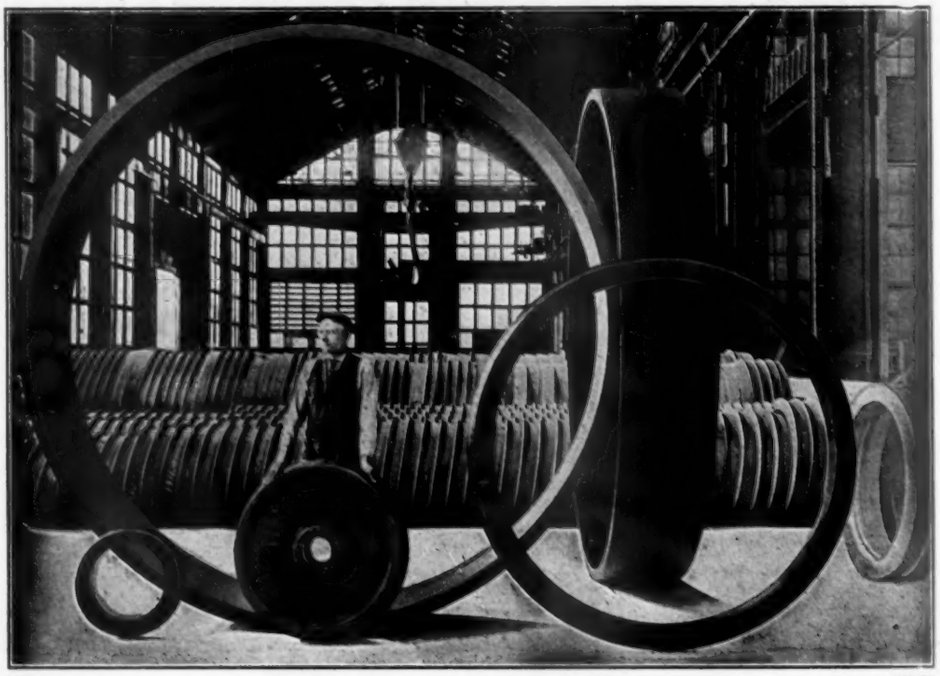

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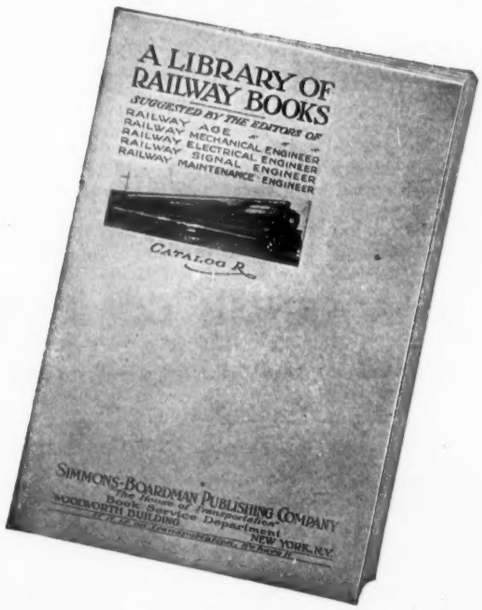

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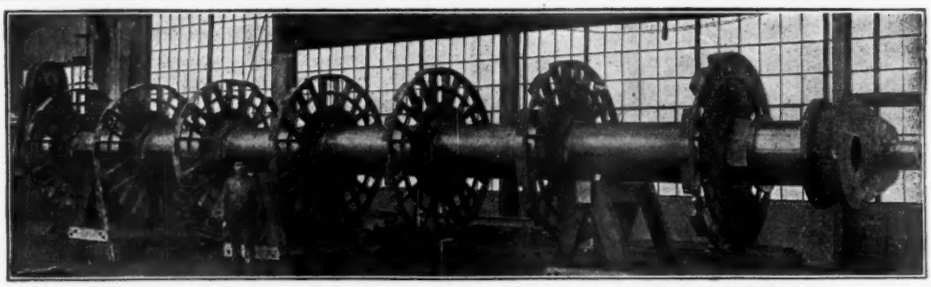

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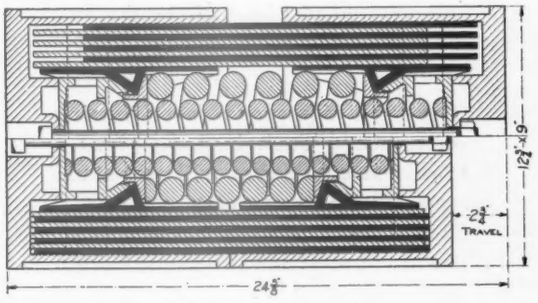

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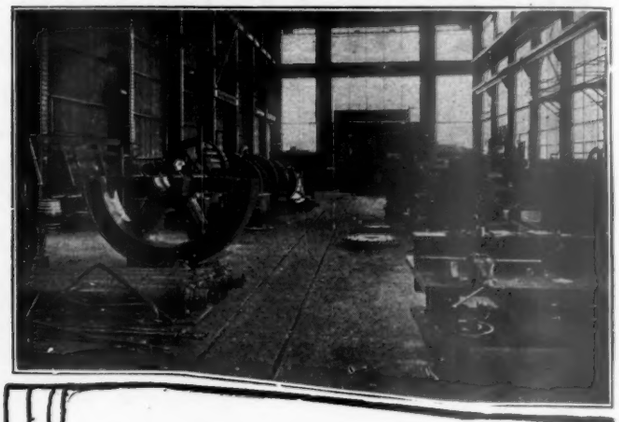

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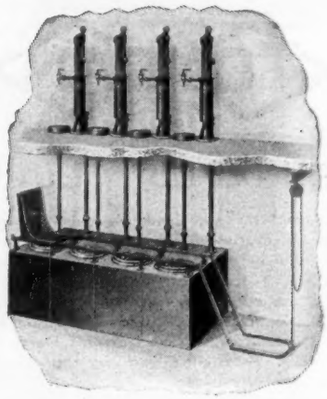

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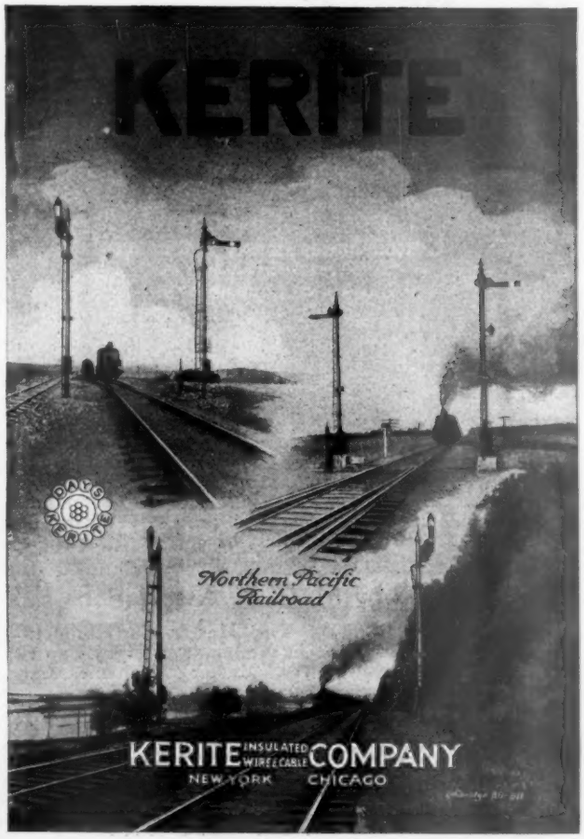

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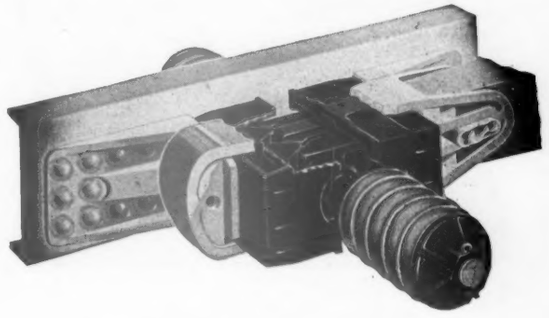

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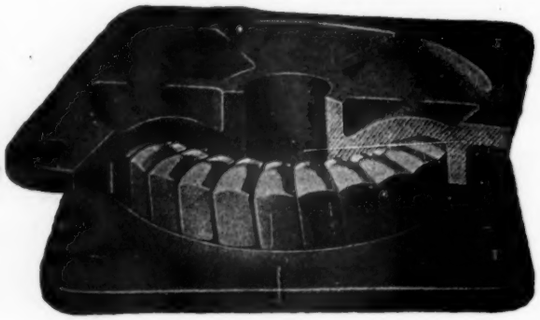

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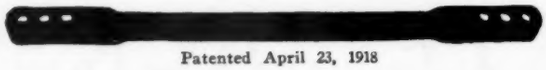

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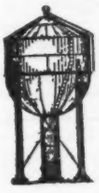

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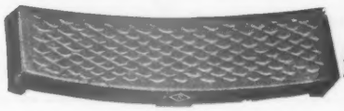
Safety  Economy

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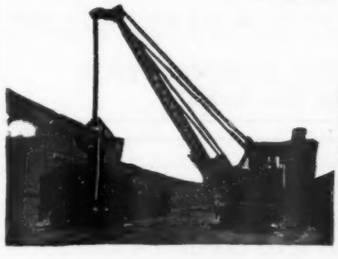

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Roller Center Plates
Lessens Wheel Flange Wear
Reduces Friction on Rails 15%

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"FALLS HOLLOW" staybolts are the CHEAPEST, SAFEST

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The recent locomotive boiler explosion in which the government inspectors found many staybolts broken at the inner end, would not have occurred if "FALLS HOLLOW" (hollow-clear-through) had been used.

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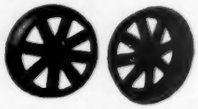
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Adopted by several railroads. Lasts as long as the cars. Cuts, dents, etc., heal themselves. Worn spots can be filled to original thickness without showing. Is resilient and easy under foot. Non-slipping.

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WILL REDUCE FUEL AND LABOR COSTS

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Standard for 25 years for car and station steps. Stanwood Steps, Karbolith Flooring Composition.
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ALL GRADES FOR CAR SEATS
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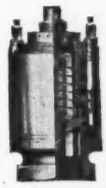
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Serves, Saves and Satisfies
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Pressed Steel for all Classes of Passenger Service
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FERALUN Anti-Slip Treads
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"Outlast the Factory"
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A complete line for all railroad requirements.
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Present an
UNUSUAL COMBINATION
In That They Give BETTER RESULTS AT LESS COST
Manufactured and sold by
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ANNUAL CAPACITY, 25,000 TONS
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Reeved Type Bucket—great biting power with sturdy design.
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Furnished in all standard sections
Effects great economy in maintenance on all curves for congested traffic
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For the Locomotive and Car Building Shop
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Can be used with clam shell bucket, dragline bucket, lifting magnet, or grappling hooks.
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For Every Class of Service
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Grain Doors, Cross Ties, Switch Ties, Piling, Car Oak, Yellow Pine and Fir Lumber

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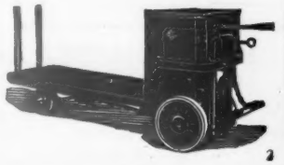

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30 cu. yds. Level Full;
43 cu. yds. Normal Loading;
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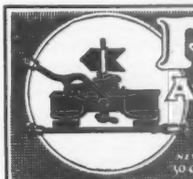

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Automatic Safety Switch Stands
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Heating and Ventilating Systems
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Track Tools, Track Jacks, Nut Locks, Rail Joint Springs, Shop Tools
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ENGINEERS-CONSTRUCTORS
Electrical — Civil — Mechanical
Specialists in the planning of railroad properties and their construction. Offering complete service from conception to operation, eliminating hazardous division of responsibility and insuring maximum economy.
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An organization experienced in laying-out, designing, building and equipping railroad shops and terminals.
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Investigations, Reports, Appraisals, Expert Testimony, Bridge and Structural Work, Electrification. Grade Crossing Elimination, Foundations, Docks, Water Supply. River and Flood Protection, Drainage and Sanitation, Naval Architecture.

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Will present your
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Our complete and experienced organization is at your service for the design and construction of railway structures of every character.
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Complete railroad shops and Locomotive Terminals
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Reinforced concrete viaducts, track elevation work, railroad terminals, piers, docks, general civil engineering and construction work.

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CHICAGO

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Reinforcements of Long Spans a Specialty
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Agent and attorney for parties having business with and cases before the Interstate Commerce Commission, Railroad Administration, etc.
Prefers settlements without formal proceedings.

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Engineers—Constructors
Industrial Plants, Buildings, Steam Power Plants, Water Powers, Gas Plants, Steam and Electric Railroads, Transmission Systems.
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ROBERT W. HUNT & CO., ENGINEERS
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CHEMICAL AND PHYSICAL TESTS
ESTABLISHED OFFICES IN
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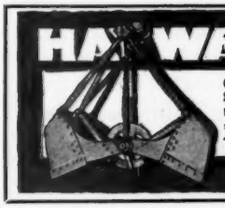
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Clam Shell, Orange Peel, Electric Motor, and Drag Scraper Buckets for all excavating, dredging, and rehandling purposes. Ask for Catalog 43, or consult our engineers gratis.
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AMERICAN Balance, SEMI-PLUG Piston and JACK WILSON
High Pressure Slide Valves and Packing Rings.
Manufactured by
C. C. YOUNG, JERSEY SHORE, PA.

U.S. CAST IRON PIPE
Unusual Facilities For Prompt Shipment
UNITED STATES CAST IRON PIPE & FOUNDRY CO.
General Offices - Burlington, N.J.

Classified Advertisements—Help and Situation Wanted advertisements appearing in the "Get Together Department," 5c. a word an insertion, including ten words for address. Minimum charge $1.00 for each insertion. For Sale advertisements, $3.00 a column inch (1" deep x 1⅝" wide). Any number of inches may be used. Copy must be in this office by Saturday noon to insure insertion in the following week's issue.

POSITION OPEN

A LEADING organization desiring to fill an important position for obvious ethical and other reasons, cannot invite directly the candidacy of any particular man. Similarly, no well connected man will exploit personally his own qualifications, no matter how receptive he may be to overtures. The undersigned has been retained by a national clientele for many years, as a medium for negotiating preliminaries in such cases. Your permission to send booklet discussing this problem and describing the service, will in no degree obligate or compromise you. Strictly confidential. R. W. Bixby, Inc., 302 Lockwood Bldg., Buffalo, N. Y.

POSITION OPEN

WANTED: High grade man to take charge of foundries of large chilled iron railroad car wheel producer in middle west. Prefer combination of executive and technical man. Write fully, stating present employment, past experience, age, etc. Also state salary expected, although the right man will be paid the right salary. Unless your capabilities and experience are of high grade, do not write, as even if employed then the position would prove only temporary, because this is a job that must sooner or later be occupied only by first class man. Address Box 373 Railway Age, 608 S. Dearborn street, Chicago.

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WANTED: Experienced locomotive elevation and detail draftsmen. Apply to H. K. Porter Co., 49th St., Pittsburgh, Pa., giving full details, including age, education, experience and salary expected.

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WANTED position as superintendent or trainmaster by young man who is qualified. Can furnish excellent reference. Address Box 377, Railway Age, Woolworth Building, New York City.

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SEND for Free Special Bulletin and learn how to increase your knowledge of practical railroad work and fit yourself for promotion. The Railway Educational Bureau, Omaha, Nebr.

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We have a small, well equipped factory in Canada, now engaged in manufacturing Railway specialties for our own use. We are in a position to take on additional work, suitable for our machines, and would like to hear from manufacturers who desire to have their material made in Canada. Address

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Use the Classified Section, when in need of a man or looking for a position.

FREIGHT CARS 4'8½"

45 Box	60M Capy.
4 "	50M "
15 Flats	50M "
8 Gondolas	50M "
10 All Steel Ore	100M "

MORSE BROS. MACHY. & SUPPLY CO.
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HYMAN-MICHAELS CO.
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Have You Second-hand Equipment to Sell?

The Get-Together Department is the proper place to put your advertisement. Your sales message goes direct to the men interested in the purchase of second-hand equipment.

7,554 NEW RAILROAD CARS

(European Types)

For sale by the WAR DEPARTMENT

By sealed bids closing JULY 6, 1922 at 3 P. M. (Eastern Standard Time), at WASHINGTON, D. C.

Types, Locations and Quantities of Cars Offered in This Sale

At Norfolk, Va.
(Quartermaster Intermediate Depot)

75 Box Cars
529 Flat Cars
1,550 Low Side Gondolas
3,650 High Side Gondolas
(No tarp. rigging)
1,450 High Side Gondolas
(With tarp. rigging)

At Brooklyn, N. Y.
(General Intermediate Depot)

1st Ave. and 59th St.
300 Low Side Gondolas

The Government reserves the right to reject any or all bids.

The cars offered in this sale were built by American manufacturers for military service in France. They are unused, but the government does not guarantee their condition.

Component parts of these cars are stored in lots of 50 cars each at Norfolk, Va., with one or two exceptions, where lots include a smaller number of cars.

Contents of the various lots of cars are listed in the standard packing list on file in the office, Chief of Engineers. The War Department does not guarantee that all parts necessary are contained in each lot. Bids must be for lots as they now exist. One car has been assembled at Norfolk Q. M. Intermediate Depot for inspection by prospective bidders.

No proposal will be considered unless accompanied by certified check of 10% of bid. Bids must be made in duplicate upon special form sent upon request.

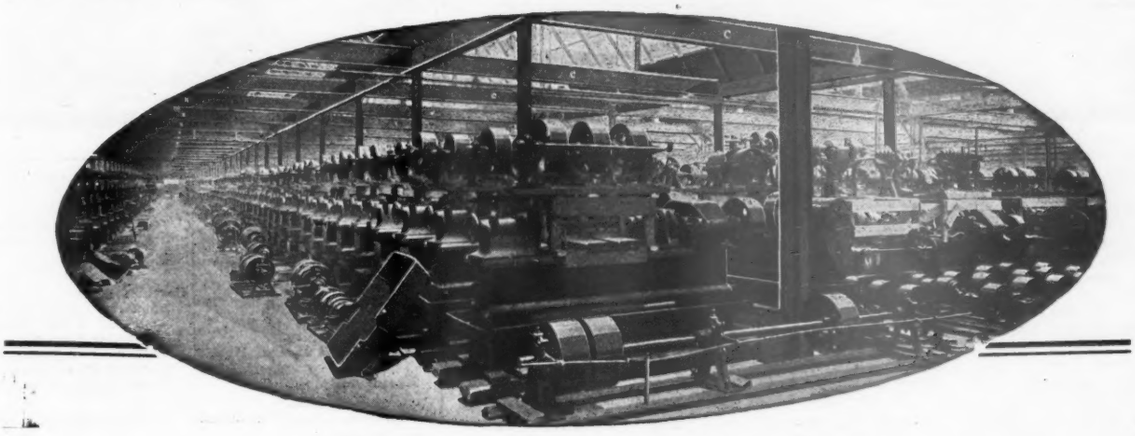
Send for Proposal Blank and full information, which is necessary before making inspection and filing bid. Address:

Chief of Engineers

2828 Munitions Bldg.
WASHINGTON, D. C.

U.S. CORPS OF ENGINEERS

WAR DEPARTMENT



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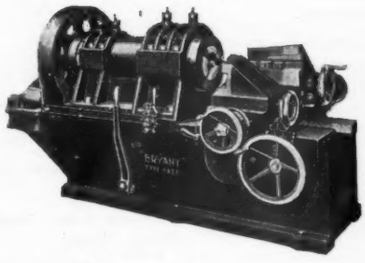
to the last needed machine

You can't afford to miss a trip through the War Department's great warehouse full of machinery. It will be a revelation. Your own equipment needs will spring into instant response to the possibilities revealed. Send a man or go yourself to

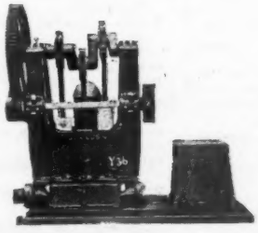
CHICAGO, During JUNE or JULY

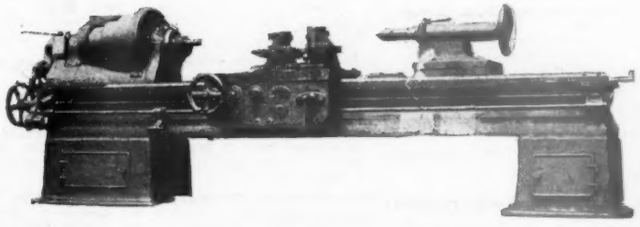


There are:—
Lathes up to 26 in. swing by 16 ft. bed; Grinders; Pumps (Hydraulic); Accumulators; Hydraulic Fittings; Forging Presses; Steam Hammers; Power Presses; Blowers; Furnaces; Air Compressors; Magnets; Jib Cranes; Roller Conveyor; Miscellaneous Shop Maintenance Supplies. The sale is by negotiation, and you may easily complete your purchase at once. The Government will accept any price it considers reasonable, but reserves the right to reject any or all bids.

Write to Chairman,

Chicago District Ordnance Salvage Board,
7400 South Ashland Avenue, Chicago, Ill.

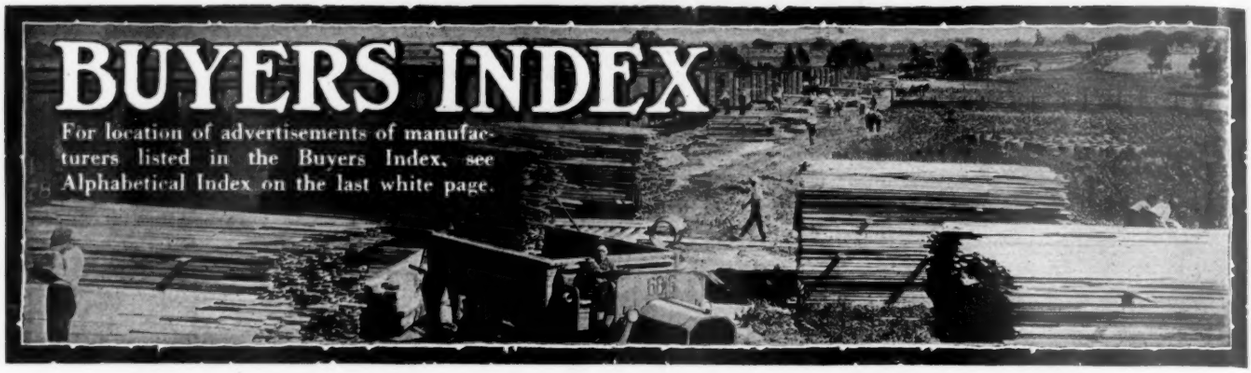




WAR DEPARTMENT

BUYERS INDEX

For location of advertisements of manufacturers listed in the Buyers Index, see Alphabetical Index on the last white page.



Acetylene, Dissolved.
Air Reduction Sales Co.

Air Lifts.
Ingersoll Rand Co.

Air Reservoir Joints—(See Joints, Air Reservoir).

Angle Bars — (See Joints, Rail).

Angles, Channels and Tees—(See Shapes, Structural).

Arch, Locomotive Brick.
American Arch Co.

Arresters, Lightning.
Federal Signal Co.
General Railway Signal Co.
Hall Switch & Signal Co.
P. & M. Co., The
Union Switch & Signal Co.

Ash Conveyors.
Conveyors Corp. of America.

Automatic Train Control.
Miller Train Control Corp.
National Safety Appliance Co.

Axles, Car and Locomotive.
American Locomotive Co.
Baldwin Locomotive Works.
Illinois Steel Co.
Johnson Co., J. R.
Standard Steel Works.

Babbit Metal.
More-Jones Brass & Metal Co.

Barges, Steel.
American Bridge Co.
Pittsburgh-Des Moines Steel Co.

Barrels, Tumbling.
Whiting Corp.

Bars, Concrete Reinforcing.
American Steel & Wire Co.
Cambria Steel Co.
Illinois Steel Co.
Interstate Iron & Steel Co.
Midvale Steel & Ordnance Co.

Bars, Iron and Steel.
Ewald Iron Co.
Falls Hollow Staybolt Co.
Illinois Steel Co.
Ryerson & Son, Joseph T.

Batteries, Electric Storage.
Electric Storage Battery Co.
Safety Car Heating & Lighting Co.
Stone Franklin Co.

Batteries, Wet Cell.
Electric Storage Battery Co.

Bearings, Center.
Chicago Ry. Equipment Co.
Miner, W. H.
Symington Co., T. H.
Woods & Co., Edwin S.

Bearings, Journal.
Magnus Co., Inc.
More-Jones Brass & Metal Co.

Bearings, Side.
American Steel Foundries.
Chicago Railway Equipment Co.
Fort Pitt Malleable Iron Co.
Miner, W. H.
Standard Car Truck Co.
Wine Ry. Appliance Co.
Woods & Co., Edwin S.

Benders, Rail.
American Chain Co.

Bending and Straightening Machines.
Ryerson & Son, Joseph T.
Sellers & Co., Inc., Wm.

Billets, Steel.
United Alloy Steel Corp.
Illinois Steel Co.

Blocks, Creosoted.
Century Wood Preserving Co.
International Creosoting & Constr. Co.
Jennison Wright Co.

Blower Fittings, Automatic Smokebox.
Barco Mfg. Co.

Blow Off Line Joints, Roundhouse—(See Joints, Etc.)

Boilers, Locomotive.
American Locomotive Co.
Baldwin Locomotive Works.

Boilers, Water Tube.
Babcock & Wilcox.

Bolsters, Steel.
American Steel Foundries.
Scullin Steel Co.

Bolts and Nuts.
Boss Nut Co.
National Malleable Castings Co.
Russell, Burdsall & Ward Bolt & Nut Co.
Ryerson & Son, Joseph T.

Bolts, Patch.
Falls Hollow Staybolt Co.

Bolts, Tack.
Illinois Steel Co.

Books, Railway.
Gibson-Pribble Co.
Simmons-Boardman Publishing Co.

Boosters.
Franklin Ry. Supply Co., Inc.

Booths, Telephone.
Dickinson, Inc., Paul.

Boring and Turning Mills, Vertical.
Niles-Bement-Pond Co.

Braces, Guard Rail.
American Chain Co.

Braces, Rail.
Fort Pitt Malleable Iron Co.
National Malleable Castings Co.
Q. & C. Co., The.
Ramapo Iron Works.

Brake Beams.
American Steel Foundries.
Chicago Railway Equipment Co.

Brake Beams—Supports.
American Steel Foundries.
Chicago Railway Equipment Co.

Brake Forging, Pins, Levers, Etc.
American Steel Foundries.
Schaefer Equip. Co.
Steel Car Forge Co.

Brake Heads.
American Steel Foundries.
Chicago Railway Equipment Co.
National Malleable Castings Co.

Brake Jaws.
National Malleable Castings Co.
Schaefer Equipment Co.
Steel Car Forge Co.

Brake Shoes.
American Brake Shoe & Fdy. Co.
Fort Pitt Malleable Iron Co.

Brakes, Air.
Westinghouse Air Brake Co.

Brakes, Clasp.
American Steel Foundries.

Brakes, Electric.
Westinghouse Air Brake Co.

Brakes, Hand.
Miner, W. H.
Minich Ry. Appliance Corp.
National Malleable Castings Co.
Wine Ry. Appliance Co.

Brick Locomotive Arch.
American Arch Co.

Bridge Builders.
American Bridge Co.
Arnold Co.
Fowler, Chas. Evan
Pittsburgh-Des Moines Steel Co.

Bridge Stringers — (See Stringers, Bridge).

Buckets, Clam Shell.
Blaw-Knox Co.
Brown Hoisting Machy. Co.
Browning Co.
Industrial Works.
Orton & Steinbrenner Co.

Buckets, Grab.
American Bridge Co.
Blaw-Knox Co.
Brown Hoisting Mchy. Co.
Hayward Co.
Industrial Works.
Orton & Steinbrenner Co.

Buffers, Friction.
Miner, W. H.
Westinghouse Air Brake Co.

Buffers, Radial.
Franklin Railway Supply Co., Inc.

Buildings, Iron Steel and Steel Concrete.
Arnold Co.
Ferguson Co., H. K.
McClellan & Junkersfeld, Inc.
Pittsburgh-Des Moines Steel Co.
Robertson Co., H. H.
Robinson Co., Dwight P.
Stone & Webster.
White Eng. Corp., J. G.

Buildings, Portable Steel.
Blaw-Knox Co.

Buildings, Ready-to-Erect, Structural Steel.
Steel Fabricating Corp., The

Bulldozers.
Niles-Bement-Pond Co.
Ryerson & Son, Joseph T.

Burners, Bunsen, Oxygen, Gas.
Air Reduction Sales Co.

Cables, Electric.
American Steel & Wire Co.
Kerite Insulated Wire & Cable Co.

Cableways—(See Tramways).

Calcium Carbide.
Air Reduction Sales Co.

Car Ends, Steel.
Chicago Cleveland Car Roofing Co.

Car Lighting Equipment—(See Lighting Car Equipment).

Carlines.
Chicago Cleveland Car Roofing Co.
Pressed Steel Car Co.
Standard Ry. Equipment Co.

Car Material, Wood.
Duncan Lumber Co.
Exchange Sawmills Sales Co.
Mummert Lumber & Tie Co.

Car Steps, Safety.
American Abrasive Metals Co.
Morton Mfg. Co.

Carriers, Monorail.
Conveyors Corp. of America

Car, Ballast.
General American Car Co.
Pressed Steel Car Co.
Western Wheeled Scraper Co.

Cars, Dump.
Clark Car Co.
General American Car Co.
Pressed Steel Car Co.

Cars, Freight.
General American Car Co.
Greenville Steel Car Co.
Pressed Steel Car Co.
Ralston Steel Car Co.
Ryan Car Co.

Cars, Hand and Push.
Fairbanks Morse & Co.
Mudge & Co.

Cars, Industrial.
Pressed Steel Car Co.
Whiting Corp.

Cars, Motor (Section).
Clark Car Co.
Fairbanks Morse & Co.
Mudge & Co.

Cars, Ore.
Clark Car Co.
Pressed Steel Car Co.

Cars, Passenger.
Pressed Steel Car Co.
Ralston Steel Car Co.

Cars, Rebuilt and Repaired.
General American Car Co.
Greenville Steel Car Co.
Pressed Steel Car Co.
Ralston Steel Car Co.
Ryan Car Co.

Cars, Refrigerator.
Pressed Steel Car Co.

Cars, Second Hand.
Morse Bros. Machinery Co.

Cars, Self-Propelled Passenger.
Russell Co., The.

Cars, Shapes, Pressed Steel.
Morton Mfg. Co.
Sharon Pressed Steel Co.

Cars, Tank.
General American Car Co.
General American Tank Corp.
Pennsylvania Tank Car Co.
Pressed Steel Car Co.
Western Wheeled Scraper Co.

Castings, Brass and Bronze.
Magnus Co., Inc.
More-Jones Brass & Metal Co.

Castings, Gray Iron.
American Brake Shoe & Fdy. Co.
American Locomotive Co.
Baldwin Locomotive Works.
Midvale Steel & Ordnance Co.
National Malleable Castings Co.
Ramapo Iron Works.

Castings, Malleable Iron.
American Malleable Castings Assn., The
Fort Pitt Malleable Iron Co.
National Malleable Castings Co.
P. & M. Co., The

Castings, Steel.
American Locomotive Co.
American Steel Foundries.
Edgewater Steel Co.
McConway & Torley Co.
Standard Steel Works.
Union Spring & Mfg. Co.

Cement.
Portland Cement Assn.

Cement, High Temperature.
Johns-Manville, Inc.

Center Plates—(See Bearings, Center).

Chain.
American Chain Co.

Chemicals.
Dearborn Chemical Co.

Chemists.
Dearborn Chemical Co.
Hunt & Co., Robert W.
Pittsburgh Testing Laboratories.

Chimneys, Cast Iron.
Dickinson, Inc., Paul

Cinder Handling Plants.
Conveyors Corp. of America
Roberts and Schaefer Co.

Circuit Breakers.
Federal Signal Co.
General Ry. Signal Co.
Hall Switch & Signal Co.
Union Switch & Signal Co.

Clamps, Flanging.
Ryerson & Son, Joseph T.

Clamps, Guard Rail.
American Chain Co.
Q. & C. Co., The.

Clamps, Hose.
National Malleable Castings Co.
Westinghouse Air Brake Co.

Clamps, Pipe.
Franklin Ry. Supply Co., Inc.
National Malleable Castings Co.

Cleaners, Flue.
Ryerson & Son, Joseph T.

Closets, Water.
Dunar Co.

Coach and Coach Yard Steam Joints—(See Joints, Etc.)

Coal Ore and Ash Handling Machines.
Brown Hoisting Machinery Co.
Conveyors Corp. of America.
Orton & Steinbrenner Co.
Roberts and Schaefer Co.

Coaling Stations.
American Bridge Co.
Fairbanks Morse & Co.
Gifford-Wood Co.
Pittsburgh-Des Moines Steel Co.
Roberts and Schaefer Co.

Columns, Water.
Pittsburgh-Des Moines Steel Co.

Cocks, Angle.
Westinghouse Air Brake Co.

Columns, Cast Iron Building.
U. S. Cast Iron Pipe & Fdry. Co.

For location of advertisements of manufacturers listed in the Buyers Index, see Alphabetical Index on the last page next to cover

BUYERS INDEX

Compounds, Boiler.
Dearborn Chemical Co.

Compressors, Air.
Ingersoll Rand Co.

Conduits, Metallic Flexible.
Barco Mfg. Co.
Franklin Railway Supply Co., Inc.

Connections, Truck Lever.
National Malleable Castings Co.
Schaefer Equipment Co.

Connectors, Automatic T. P.—(See Train Pipe Connectors, Automatic).

Connectors, Electrical.
Westinghouse Elec. & Mfg. Co.

Control Devices, Train Speed.
Federal Signal Co.
General Ry. Signal Co.
Miller Train Control Corp.
Union Switch & Signal Co.

Converters, Steel.
Whiting Corp.

Conveyor, Ash—(See Coal, Ore and Ash Handling Mach.)

Conveying Machinery.
American Bridge Co.
Conveyors Corp. of America
Gifford-Wood Co.
Industrial Works.
Orton & Steinbrenner Co.

Cooling Compounds, Journal Hot Box.
Mohawk Lubricating Co.

Corkboard.
Stone Corp., Junius H.

Counselor, Railway.
Hale, Arthur

Couplers.
American Steel Foundries.
Franklin Railway Supply Co., Inc.
McConway & Torley Co.
National Malleable Castings Co.
Q & C Co., The
Standard Coupler Co.
Westinghouse Air Brake Co.

Coupler Pockets—(See Draft Yokes).

Couplings, Hose.
Fort Pitt Malleable Iron Co.
Ingersoll Rand Co.
Westinghouse Air Brake Co.

Covering, Seat Rattan.
Hale & Kilburn Corp.

Cranes, Electric Traveling.
Brown Hoisting Mchy. Co.
Ferguson Co., H. K.
Niles-Bement-Pond Co.
Whiting Corp.

Cranes, Gantry.
Brown Hoisting Mchy. Co.
Industrial Works.
Niles-Bement-Pond Co.
Orton & Steinbrenner Co.
Whiting Corp.

Cranes, Jib.
Brown Hoisting Mchy Co.
Industrial Works.
Niles-Bement-Pond Co.
Whiting Corp.

Cranes, Locomotive.
Brown Hoisting Mchy Co.
Industrial Works.
Ohio Locomotive Crane Co.
Orton & Steinbrenner Co.

Cranes, Portable.
Brown Hoisting Mchy. Co.
Industrial Works.
Orton & Steinbrenner Co.

Cranes, Tractor.
Industrial Works.
Northwest Engineering Co.

Cranes, Wrecking.
Brown Hoisting Mchy. Co.
Industrial Works.
Orton & Steinbrenner Co.

Crank Pins — (See Pins, Crank).

Creosote.
American Creosoting Co.
Century Wood Preserving Co.
International Creosoting & Construction Co.

Creosoted Lumber.
American Creosoting Co., Inc., The
International Creosoting & Constr. Co.

Cross-Arms.
American Bridge Co.

Crossings — (See Frogs and Crossings).

Crossheads and Shoes.
Baldwin Locomotive Works.
Barco Mfg. Co.

Crushers, Coal.
Orton & Steinbrenner Co.

Culverts.
American Sheet & Tin Plate Co.
Armco Culvert & Flume Mfrs. Assn.
Canton Culvert & Silo Co.
U. S. Cast Iron Pipe & Fdry Co.

Cupolas, Foundry.
Whiting Corp.

Curtains and Fixtures, Car Vestibule.
Morton Mfg. Co.

Curtains and Fixtures, Car Window.
Morton Mfg. Co.

Cutters, Flue.
Ryerson & Son, Joseph T.

Cutting and Welding Apparatus (Oxy-Acetylene).
Air Reduction Sales Co.

Cyclopedias, Railway.
Simmons-Boardman Publishing Co.

Cylinders, Gas, Acetylene, Etc.
Air Reduction Sales Co.

Derricks.
Industrial Works.

Diaphragms for Cars, Canvas and Steel.
Morton Mfg. Co.

Diaphragms, Buffing Mechanism.
Morton Mfg. Co.

Dies, Threading.
Greenfield Tap & Die Corp.

Ditching Machinery.
Industrial Works.

Door Fixtures—(See Fixtures, Car Door).

Door, Locomotive, Fire-Box.
Franklin Railway Supply Co., Inc.

Doors, Car.
Miner, W. H.
Wine Ry. Appliance Co.

Doors, Grain.
Exchange Sawmills Sales Co.
Mummert Lumber & Tie Co.

Doors, Steel.
Morton Mfg. Co.

Draft Arms.
American Steel Foundries.

Draft Gears.
Fort Pitt Malleable Iron Co.
Hall Draft Gear Corp.
Keyoke Ry. Equip. Co.
Miner, W. H.
Keyoke Ry. Equip. Co.
Standard Coupler Co.
Symington Co., T. H.
Union Draft Gear Co.
Westinghouse Air Brake Co.

Draft Yokes.
American Steel Foundries.
Miner, W. H.
National Malleable Castings Co.
Steel Car Forge Co.

Drawbar Centering Device.
Miner, W. H.

Dredging Machinery.
Industrial Works.
Pittsburgh-Des Moines Steel Co.

Drills, Track and Bonding.
Ingersoll Rand Co.

Drills, Twist.
Greenfield Tap & Die Corp.

Drilling Machines, Pneumatic.
Ingersoll Rand Co.

Drilling Machines, Rock.
Ingersoll Rand Co.
Oldham & Son Co., Geo.

Drilling Machines, Upright and Radial.
Niles-Bement-Pond Co.
Ryerson & Son, Joseph T.

Drinking Fountains.
Giessel Co., Henry

Driving Boxes (Extended Main).
Franklin Railway Supply Co.

Dryers, Rotary.
Whiting Corp.

Dynamos — (See Generators, Electric, Economizers, Fuel).

Electrical Supplies.
Westinghouse Elec. & Mfg. Co.

Electrification, Railroad.
McClelland & Junkersfeld.
Robinson Co., Dwight P.
Smith & Co., C. E.
Westinghouse Elec. & Mfg. Co.

Enamels, Air Drying and Baking.
Murphy Varnish Co.

Engineers and Contractors.
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Roberts and Schaefer Co.
Robinson Co., Dwight P.
Stone & Webster.
Watson Engineering Co.
White Eng. Corp., J. G.

Engineers, Construction.
Arnold Co.
Bush, Roberts & Schaefer.
Ferguson Co., H. K.
McClelland & Junkersfeld.
Roberts and Schaefer Co.
Robinson Co., Dwight P.
Stone & Webster.
Watson Engineering Co.
White Eng. Corp., J. G.

Engineers, Consulting, Civil, Elec. Hydraulic Mech. Val.
Arnold Co.
Battey, Paul L.
Bush, Roberts & Schaefer.
Ferguson Co., H. K.
Fowler, Chas. Evan.
Fowler, Geo. L.
Gilmore Co., Thomas N.
Hunt & Co., Robert W.
Muhlfeld, John E.
Smith & Co., C. E.

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Bush, Roberts & Schaefer.
Ferguson Co., H. K.
Hunt & Co., Robert W.
McClelland & Junkersfeld.
Muhlfeld, John E.
Smith & Co., C. E.
Stone & Webster.
Watson Engineering Co.
White Eng. Corp., J. G.

Engineers, Inspecting.
Arnold Co.
Bush, Roberts & Schaefer.
Ferguson Co., H. K.
Fowler, Geo. L.
Gulick, Henderson.
Hunt & Co., Robert W.
Muhlfeld, John E.
Smith & Co., C. E.

Engines, Crude and Fuel Oil.
Fairbanks Morse & Co.

Engines, Gas and Gasoline.
Fairbanks Morse & Co.

Engines, Hoisting.
Brown Hoisting Mchy. Co.
Industrial Works.
Orton & Steinbrenner Co.

Expanders, Tube.
Ryerson & Son, Joseph T.

Fans, Exhaust and Ventilating.
Buffalo Forge Co.
Mudge & Co.

Fasteners, Car Door.
Arnold Co.
Fort Pitt Malleable Iron Co.
Miner, W. H.
National Malleable Castings Co.

Ferro Molybdenum.
Vanadium Corp. of America.

Ferro, Tungsten.
Vanadium Corp. of America.

Ferro Vanadium.
Vanadium Corp. of America.

Fencing, Wire — (See Wire Fence).

Fibre and Fibre Products.
Continental Fibre Co.

Filters, Water and Industrial.
Graver Corp.

Filtration Plants, Water.
Graver Corp.

Fireboxes.
American Locomotive Co.
Baldwin Locomotive Works.

Fittings, Air Brake.
National Malleable Castings Co.
Westinghouse Air Brake Co.

Fittings, Flanged Pipe.
U. S. Cast Iron Pipe & Fdry. Co.

Fixtures, Car Door.
Miner, W. H.
National Malleable Castings Co.

Flangers, Snow.
Q. & C. Co., The

Flooring.
Jennison Wright Co.
Stone Corp., Junius H.

Flooring, Composition Car.
American Mason Safety Tread Co.
Stone Corp., Junius H.

Flooring, Steel.
Morton Mfg. Co.

Flooring, Wood Block—(See Also Blocks, Creosoted).
Carter Bloxonend Flooring Co.
Exchange Sawmills Sales Co.

Flue Cleaners—(See Cleaners, Flue).

Flue Cutters — (See Cutters, Flue).

Flues, Boiler — (See Tubes, Boiler).

Forges, Rivet Heating.
Buffalo Forge Co.
Ferguson Furnace Co.
Ryerson & Son, Joseph T.

Forgings.
American Bridge Co.
American Steel Foundries.
Edgewater Steel Co.
Gifford-Wood Co.
Illinois Steel Co.
Steel Car Forge Co.

Forgings, Drop.
Steel Car Forge Co.

Forms, Steel, For Concrete Construction.
Blaw-Knox Co.

Foundations.
Fowler, Chas. Evan.
Smith & Co., C. E.

Foundry Equipment.
Whiting Corp.

Foundry Supplies.
Whiting Corp.

Frames, Locomotive.
American Locomotive Co.
American Steel Foundries.
Baldwin Locomotive Works.

Frames, Truck.
American Locomotive Co.
American Steel Foundries.
Baldwin Locomotive Works.
Franklin Railway Supply Co., Inc.
Scullin Steel Co.

Frames, Vanadium.
American Locomotive Co.
Baldwin Locomotive Works.

Frogs and Crossings.
Ramapo Iron Works.

Fulcrums, Brake Beam.
American Steel Foundries.
Chicago Ry. Equipment Co.
National Malleable Castings Co.

Furnaces, Annealing and Case Hardening.
Ferguson Furnace Co.
Whiting Corp.

Furnaces, Forging.
Ferguson Furnace Co.

Furnaces, Heat Treating.
Ferguson Furnace Co.

Furnaces, Melting.
Whiting Corp.

Furnaces, Rivet Heating—(See Forges, Rivet Heating).

Gage Testers—(See Testers, Gage).

Gages, Machinists.
Greenfield Tap & Die Corp.

Gages, Steam.
Ashton Valve Co.

Gages, Wheel Press Recording.
Ashton Valve Co.

Gaskets.
Continental Fibre Co.

Gates, Tail.
Morton Mfg. Co.

Gear Blanks, Rolled Steel.
Standard Steel Works.

Gears and Pinions.
American Steel Foundries.

Gears, Valve — (See Valve Gears).

Generators, Acetylene.
Air Reduction Sales Co.

Generators, Car Lighting.
Safety Car Lighting & Heating Co.
Stone Franklin Co.

Generators, Electric.
Fairbanks Morse & Co.

Glass, Wire.
Mississippi Wire Glass Co.

Graphite, Lubricating.
Galena Signal Oil Co.

Grapples, Wood.
Industrial Works.

Grate Shakers.
Franklin Railway Supply Co., Inc.

Grease Forming Machines.
Franklin Railway Supply Co., Inc.

Grinding Machines, Portable.
Ingersoll Rand Co.

Guard Rail (One Piece).
American Chain Co.

Guards, Cattle.
American Bridge Co.

Guards, Dust.
Symington Co., T. H.

Hammers, Pneumatic.
Ingersoll Rand Co.
Oldham & Son Co., Geo.

Hammers, Steam.
Industrial Works.
Niles-Bement-Pond Co.
Ryerson & Son, Joseph T.

Hand Brakes—(See Brakes, Hand).

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Hangers, Car Door—(See Fixtures, Car Door).
Ryerson & Son, Joseph T.

Heaters, Feed Water.
Graver Corp.
Superheater Co., The

Heating and Ventilating, Apparatus.
Buffalo Forge Co.
Vapor Car Heating Co., Inc.

Heating Systems, Car (Electric and Steam).
Safety Car Heating & Lighting Co.
Vapor Car Heating Co., Inc.
Wine Ry. Appliance Co.

Heating Units, Independent.
Sturtevant Co., B. F.

Hoisting Machinery.
American Bridge Co.
Brown Hoisting Mchy Co.
Gifford-Wood Co.
Industrial Works.
Orton & Steinbrenner Co.

Hoists, Coach.
Whiting Corp.

Hoists, Chain.
Ryerson & Son, Joseph T.

Hoists, Electric.
Brown Hoisting Mchy. Co.

Hoists, Locomotive.
Whiting Corp.

Hoists, Pneumatic.
Ingersoll Rand Co.
Oldham & Son Co., Geo.
Whiting Corp.

Holders, Angle Cock.
Mudge & Co.

Hooks, Wrecking.
National Malleable Castings Co.

Hoppers, Wet and Dry (Car).
Dunor Co.

Hose, Air, Steam, Etc.
Oldham & Son Co., Geo.
Westinghouse Air Brake Co.

Hydrogen.
Air Reduction Sales Co.

Icing Station Equipment.
Gifford-Wood Co.

Ingots.
Edgewater Steel Co.
Illinois Steel Co.
McConway & Torley Co.
Midvale Steel & Ordnance Co.
National Malleable Castings Co.
United Alloy Steel Corp.

Inspection of Material and Equipment—(See Engineers, Inspection).

Insulation, Electrical.
Continental Fibre Co.
Johns-Manville, Inc.

Insulation, Heat.
Johns-Manville, Inc.
Lehon Co., The.
Miner, W. H.
Stone Corp., Junius H.

Insulation, Track.
Continental Fibre Co.

Iron Chain.
Falls Hollow Staybolt Co.

Iron, Charcoal.
Ewald Iron Co.
Falls Hollow Staybolt Co.
Parkesburg Iron Co.

Iron, Hollow Staybolt.
Falls Hollow Staybolt Co.
Rome Iron Mills, Inc.

Iron, Pig.
Illinois Steel Co.

Iron, Refined.
Ewald Iron Co.
Ryerson & Son, Joseph T.

Iron Staybolt—(See Also Staybolts).
Ewald Iron Co.
Falls Hollow Staybolt Co.
Rome Iron Mills, Inc.
Ryerson & Son, Joseph T.

Jacks, Lifting.
Buckeye Jack Mfg. Co.

Jacks, Smoke.
Dickinson, Inc., Paul.

Joints, Air Reservoir.
Barco Mfg. Co.
Franklin Ry. Supply Co., Inc.

Joints, Blow Off Line (Roundhouse).
Barco Mfg. Co.
Franklin Ry. Supply Co., Inc.

Joints, Coach and Coach Yard.
Barco Mfg. Co.
Franklin Ry. Supply Co., Inc.

Joints, Flexible.
Barco Mfg. Co.
Franklin Ry. Supply Co., Inc.

Joints, Rail.
American Chain Co.
American Steel Foundries.
Illinois Steel Co.
Q. & C. Co., The

Joints, Steam, Air and Liquid.
Barco Mfg. Co.
Franklin Ry. Supply Co., Inc.

Journal Boxes and Lids.
Allegheny Steel Co.
American Steel Foundries.
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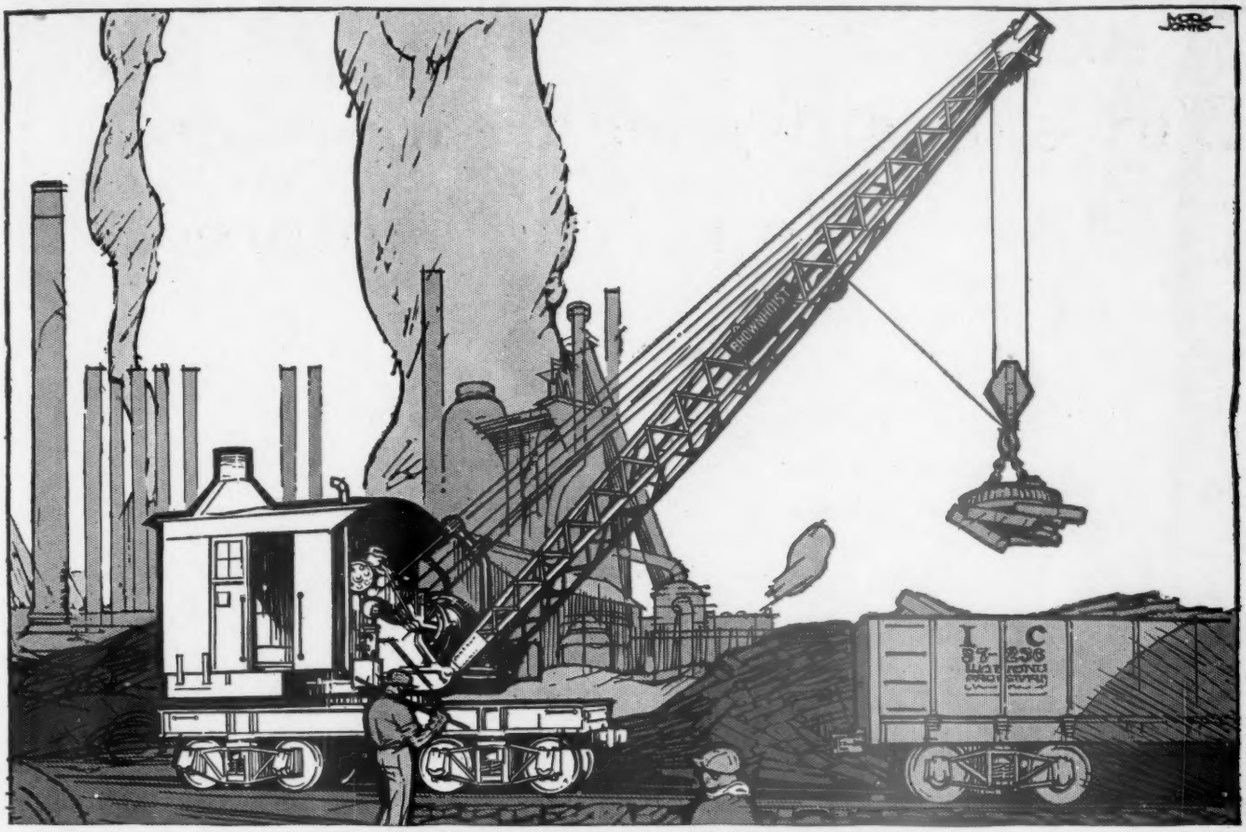


Brownhoist No. 4 Locomotive Crane handling Pig Iron with Magnet

Saving $100 To $150 A Day Unloading Raw Materials

Many industrial plants are saving 75 per cent on the handling of incoming raw materials by using a Brownhoist Crane. On this type of work a Brownhoist easily replaces fifty men.

One Brownhoist user writes—"Our crane savings are clearly shown by our unloading cost per ton. At present wages it would cost us 60 cents per ton to unload by the old method. The crane handling cost is 11 cents per ton (including all operating and depreciation costs). This nets us a saving of 49 cents a ton".

And, while in many plants handling material by magnet is the main duty of the Brownhoist, it adds greatly to its usefulness by handling coal, unloading machinery and equipment and for switching and spotting cars.

In your plant equally great savings may be possible. Catalog K shows many applications of crane economies. May we send it?

The Brown Hoisting Machinery Co., *Cleveland, Ohio*

Branches: New York, Chicago, Pittsburgh, San Francisco, New Orleans.

Products—Grab Buckets, Electric Hoists, Trolleys, Overhead Cranes, Bridge Cranes, Heavy Dock Machinery

BROWNHOIST

LOCOMOTIVE CRANES AND HOISTING DEVICES

Why stop a moving train to permit it to proceed?

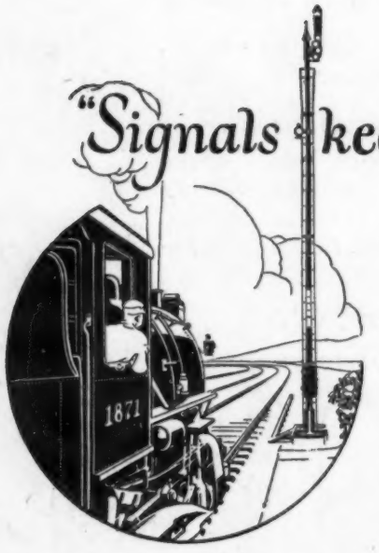
Thousands of stops are being made at grade crossings, junctions and drawbridges *because* these points are not interlocked.

Coal and time are consumed that could be saved if these points were equipped with interlocking.

As a rule, the saving in coal and time will pay the first cost of the interlocking and the yearly interest, depreciation, operation and maintenance charges.

Interlocking not only protects train movements, but is also an investment which pays dividends in coal and time saved.

"Signals keep trains moving"



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